

# COMPUTER WORLD

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## 1971: Second Year of DP Crisis and Change

By Edward J. Brinde  
Of the CW Staff

The top of the news last year was the economy. In the computer community, financial considerations were the prime force in at least four of the top 10 stories, and were considerations in many more.

It was a dramatic year, appropriate for a new decade, though all the events could not be taken postively by computer users. The CW listing of the top 10 stories, is more a composite, a snapshot of 1971, than a judgment of "top story" versus "tenth story."

RCA left the business by the back door, announcing it was dropping its computer division, in the most dramatic event of the year. One effect of this

event was the shaking of confidence by many non-IBM users, who felt the industry giant might be the only company willing to back its computer division. Other companies, however, did report profitable

**Year End Review Follows Page 10**

computer divisions, an apparently important factor in justifying perpetuation in the computer business.

The freeze delayed price increases. While RCA may have pulled off the single most dramatic event, President Nixon was a close second. His price freeze, in both "phases," delayed increases announced by IBM and Honeywell, which have since obtained permission to raise prices, and Univac, which has not

requested such permission.

"Users' Liberation" gained momentum. Users continued to become more sophisticated, partly because of tight economic times. They realized substantial savings by turning to several sources for mainframes, peripherals, training, and services.

IBM cut, then raised prices. Around mid-year, the prices dropped on purchased tape and disk drives, as well as printers. Rental customers were also offered special deals for peripherals on fixed-term lease. As smaller companies, the peripheral makers had apparently exerted enough influence on IBM to force the giant to devise new pricing structures, leading to

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### Pollution Predicted

Dr. L.J. Shieh, principal investigator of an air pollution research team at the IBM Palo Alto Scientific Center, views a map of sulphur dioxide air pollution concentrations predicted by an experimental computer model. Results of the computer simulations were compared with actual data recorded at New York City Jan. 11, 1971. The computer-assisted predictions, were within 15%, or 0.05 parts per million, of actual conditions.

### To Meet Feb. 1

## RCA Users Happy With Univac

By Frank Piasta  
Of the CW Staff  
HARRISBURG, Pa. Most RCA users are "enthusiastic."

### On the Inside

U.N. Explores DP Needs  
Of Developing Nations

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CATV May Have Potential  
For Data Transmission

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about future relations with Univac, since the company took over the RCA customer base on December 17, according to David Rau, president of the RCA Users Association.

Final judgment on the situation is being reserved by the group, however, until the next national meeting of the group in Atlanta on February 1. At that time, high Univac officials are scheduled to respond to requests that users have made to Univac and RCA.

Univac, according to Harry A. Steinberg, vice-president, controller, will not only be talking to the group, but will go to the users meeting with a spirit of making the customer happy.

### Some Problems

Some of the approaches taken

by a CW staff writer  
MONTEVALLE, N.J. Your average established computer professional is a white male who is beginning to show increased interest in attaining higher degrees of education.

He is now 37 years old, three years older than he was in 1968, which may seem obvious to some, but which may also mean that colleges and other institutions are not providing new, young talent to the computer community.

These are some of the statistics and conclusions drawn from the 1971 personnel survey conducted by the American Federation of Information Processing Societies (AFIPS). The survey is similar to one conducted in 1968.

The study disclosed that 94.8% of the 8,400 participants were Caucasians, and 88.7% of them

were male. This is about the same as three years ago, the study showed.

### Not Random Sample

While the objective of the survey was "to determine the current characteristics of the working in the information processing field," the almost 90% of the recipients and respondents who were members of professional societies "do not represent a random sample of all employees," AFIPS acknowledged. Questionnaires were sent out to over 23,000 individuals. Some 2,800 of them were attendees of the 1970 Fall Joint Computer Conference, who said they did not belong to a professional computer society.

Recipients were members of 11 AFIPS societies plus the Data Processing Management Association, which is not a member of the federation.

### More Ph.D.'s

The results showed a two-thirds increase in members with Ph.D.'s, from 7.5% three years ago to 12.6% today. Holders of Master degrees were up by one-fourth, from 24% to 30%.

The number of members with any college-level degree dropped by about a third, from 28.7% to "fewer than 18%," the survey showed.

Other questions of interest to DP managers indicated sources of professional training and job stability/mobility.

For example, computer manufacturer's customer training was given by the respondents as "the

### Notice to Subscribers

This is Computer World's special combined year-end review issue dated Dec. 29-Jan. 5. The next issue will be dated Jan. 12, 1972 and should reach subscribers by Jan. 11.

(Continued on Page 4)

## Average Professional Aging, Now He's Hit 37: Afips Survey

most prevalent source of training," or 47.1%, the survey showed. In-house training ran a close second, at 44.5%.

The figures indicated many of the participants in the study received training from more than one source.

### 1 or 2 Employees

Over half the respondents have worked for just one or two employees.

(Continued on Page 4)

## FCC Steps In, Tells AT&T: Justify DAA

By Ronald A. Frank

WASHINGTON, D.C.: The Federal Communications Commission has directed AT&T to justify the need for Direct Access Arrangement interconnection devices. The DAAs have been branded "discriminatory" by the Independent Data Communications Manufacturers Association.

The association, in an informal complaint to the FCC (CW, Dec. 22), charged the DAAs discriminate against users who provide their own modems and other non-carrier equipment.

In related letters to AT&T and other carriers, the FCC staff indicated that unless some DAA requirements were shown to be technically necessary, the commission would take action in the near future.

In the FCC letter, Bernard Strassburg, chief of the Common Carrier Bureau said, "Substantial doubt exists whether the [interconnection] tariffs are reasonable, non-discriminatory, and in

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**GTE INFORMATION SYSTEMS**

(Continued from Page 1)

new significant opportunities for users involved in price analyses. To balance the decrease in revenue, IBM upped some CPU and maintenance prices.

IBM price changes affected the software side, too, as the company distributed free Language Conversion Programs and agreed to provide free on-site systems engineering support for some users of application programs.

IBM also established two new classes of software, giving users the ability to waive or limit rental amounts.

• A new common carrier was born. Specifically, MCI started transmitting data for its first user, Trans Union Systems Corp. MCI thus became the first special common carrier to install a microwave link for a computer data user and the first alternative to using the telephone company or Western Union.

• 1970 hardware was delivered. While the number of big computers announced in 1971 was not nearly so great as during the previous year, the installation of those 1970-announced systems started last January with the delivery of the first IBM 370. The 3330 disk drives and computers of other manufacturers followed.

• Ombudsmen went to work. The Association for Computing Machinery began training computer experts to act as advocates of the public good. Using the Detroit election fiasco and common billing problems as guidance, ACM officials set out to investigate and correct computer-related problems.

• DP "spying" was investigated. On Capitol Hill, Sen. Sam Ervin conducted lengthy investigations into government spying on civilians, and into the computer's role in this activity.

• Bombings decreased, threats diminished. While concern over outdoor security threats might have declined, there were indications that the sophistication of fraud might have been on the upswing.

A programmer was arrested and charged with allegedly stealing a proprietary program by illegally accessing a computer by telephone. According to court papers, the programmer tapped a time-shared computer, to obtain a copy of a plotting program.

Later in the year, workers striking against Honeywell were charged with sabotaging the computer communications system at a major life insurance company, a Honeywell user.

• Computers touched everyone. This may appear obvious, but for the first time on a large scale, the public attitude on computers was surveyed, and over 90% of the participants believe computers affect everyone. Almost half of the 1,000 respondents have had on-the-job contact with computers at some time during their life, and about one-third still do.

According to the American Federation of Information Processing Societies (AFIPS) and Time magazine, which jointly conducted the survey, 84% of the participants said the government should be concerned with regulating computer usage. Over half said the government indeed will determine what computers can or cannot be used for.

The study further showed over one-third of the respondents had experienced billing problems "because of a computer" (the

ACM ombudsman program was initiated to help alleviate that situation).

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## RCA Users Happy With Univac

(Continued from Page 1)  
lack of features in their present software," Steinberg added. "It may be possible to give them the features in their present software," he said.

Steinberg said the first priority for the ex-RCA software team, recently hired by Univac, is the development of new levels of VMOS promised by RCA. Commitments made by RCA to other operating systems will also be honored, Steinberg said. At some time in the future, the software team will be used to generate conversion packages from Spectra 70 to Univac 9000 equipment.

"We'll have to do some systems work first," he said. "We don't know, for instance, what DOS or TDOS (RCA operating systems) really are, so we have to look at them."

"We intend to write conversion packages, but also intend not to do it that soon."

"We're really interested in keeping the people on the RCA equipment as long as they want to stay on the RCA equipment," Steinberg added.

Availability of the ex-RCA personnel is considered "a good move, from our point of view," Rau said, speaking for the users' group.

"It gives us some reassurance that they can support us," Rau added.

Users, Rau said, have a tremendous respect for Univac. Univac is a solid name. "The only other company that has any greater credibility in the field is IBM. The company can perform."

"They have the marketing organization and the background in the field. There is even a pretty good fit of equipment; they complement each other," Rau said.

The Atlanta meeting will be the first chance that the users

group will have to confront Univac management. Univac is expected to be there in force, starting with Gerald Probst, division president, who will be the luncheon speaker, Rau said.

Others slated to attend include John Butler, Univac vice-president and general manager of the "RCA task force," who will be able to answer questions on policy; and Frank Delaney or other systems programming officials, who will make commitments on software, according to Rau.

Steinberg said RCA's guaranteed conversion program was more successful in the news papers than in the marketplace, but the commitments would be honored.

Univac expects to make a small profit on the operation of the acquired installations, Steinberg admitted, but said that the company's main concern was the customer base.

## FCC Directs Ma Bell to Justify DAA

(Continued from Page 1)  
compliance with the Carterfone decision."

The present AT&T tariffs requiring the use of protective arrangements were initiated in early 1960, pending further action, and without the specific approval of the commission, Strasbourg said.

AT&T was asked, in the letter,

THE FCC, U.S. Pat. Off.

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to justify its present requirements in cases where similar equipment can be installed at a lower cost by either the phone company or an independent supplier.

If such a device is obtained directly from the supplier, under present tariffs, the telephone company may refuse to provide service or threaten to discontinue the service if the user fails to obtain a connecting arrangement, the letter charges. But when the plans are furnished by the phone company, the user is not required to obtain a separate connecting arrangement, the letter said.

In citing specific instances, the FCC letter said that the MagiCall and Code-A-Phone devices which are available either from the supplier direct or from local telephone companies, MagiCall is an automatic dialing device made by the DASA Corp. and Code-A-Phone is an automatic answer and recording unit made by the Code-A-Phone Co.

Although the units listed in the letter are not specifically for data users, an FCC staff spokesman said the same principles could apply when modems are worked to a user from both the telephone company and an independent source. Many non-Bell phone companies supply independent data sets to their subscribers.

In a second letter, the FCC

staff asked AT&T and other carriers to give specific instances where actual harm has occurred to the telephone network caused by interconnection of non-carrier equipment.

In various hearings, AT&T has consistently maintained that DAA and other connecting arrangements are necessary to prevent harm to the telephone network.

The FCC letter is aimed at finding cases where such harm has actually occurred. Opponents of AT&T's connecting arrangements have claimed the possible harm cited by Bell is more theoretical than real.

The FCC letters were sent shortly after a White Paper attacking present interconnection practices was issued by the manufacturers association. An association spokesman, commenting on the FCC letters, told C&W, "The commission, data users and the public will now be given sufficient evidence to determine whether any [interconnection] restrictions are needed. If the commission decides such restrictions are necessary, they must be reasonable and applied in a non-discriminatory manner."

Strasbourg said that after the FCC receives replies from the carriers, formal FCC proceedings may be initiated.

## Average DP Professional Is Older

(Continued from Page 1)  
players since they entered the computer field; 32.8% have worked for just one employer, and 24.3% have worked for two.

Of the sample, 40% were listed as supervisors in their company's organizational chart, the study showed.

That computer professionals are more experienced was borne out by another statistic: three years ago, only 40% had more than eight years experience in the field. Now, 46.6% have over eight years in the computer business.

Participants were both technicians and users. About one-fourth said their job was in com-

puting, while 17% were in Research and Development, and 14% said they were in engineering.

Each of the other categories had fewer than 10% with professional backgrounds. The ranking tops (behind engineering) with 7.5%. Others mentioned from 5% to 7.5% included marketing, administration and personnel, library, and education.

The summary report is being sent for \$3 from Aflis Press, 210 Summit Ave., 07645. The full report, "giving many more breakdowns and comparisons" is expected "at a later date." Aflis related.

## News Wrapup

### Honeywell Price Raises Approved

WASHINGTON, D.C. — Honeywell has joined IBM and NCR on the list of computer companies allowed to raise some prices by the Price Commission.

The Honeywell increase for most central processors and peripherals will be about 4%, with rental of the 105 and the 6000 series computers rising 5%. Purchase prices on the two will rise 5% and 6% respectively.

Maintenance rates will also go up by 7.5%.

In a related action, Xerox has applied to the commission for an 8% increase in the price of its Sigma 3 system.

The commission has not yet acted on the request of Burroughs to raise maintenance rates by 2.5%.

### Computer Dating Firm Indicted for Fraud

CHICAGO — Grand theft and conspiracy charges have been lodged against a computer dating firm here by a Cook County Grand Jury, alleging the firm collected almost \$350,000 without providing dates or even using a computer.

Assistant State's Attorney Peter Costa, head of the fraud and consumer complaint department, said the case should come to trial in a month or two. The dating firm, known variously as Compatibility, Inc., of Chicago and Computer Evaluation of Miami, Inc., is charged with 21 counts of grand theft by deception and one count of conspiracy to commit grand theft. Each charge carries a 1- to 10-year sentence.

Persons were alleged to have paid the firm a \$500 fee for 2 to 10 compatible dates a month over a 5-year period if accepted as clients.

### County Will Use Tax Data to Pay DP Costs

MUNCIE, Ind. — A bill scheduled for introduction in the Indiana legislature at its next session would permit County auditors here to make available to private parties tax information stored in auditing department computers.

According to Jerry Thornburg, county auditor for Delaware County, the information relates to delinquent taxes and the sale of property to pay these fees.

"Banks and financial institutions will normally pay the back taxes on properties on which they hold mortgages," Thornburg explained. "However, learning these conditions exist requires time-consuming research. We could supply this information, and the fees we would collect will help pay county data processing costs."

### State Colleges Linked to UCLA Computer

LOS ANGELES — A network linking UCLA's IBM 360/91 to the data processing system of 19 California state colleges has been completed, putting the power of the large computer on every state college campus, according to a UCLA spokesman.

The linkup, which ties the 360/91 to the state colleges' two regional data centers and through them to the campuses, allows users to process large-scale and highly specialized problems on the large system. Those working on a problem enter data into the network from punched cards at a terminal on an individual campus. The data is transmitted by telephone line to the regional center and then by special data link to UCLA.

### Idaho Counties Trade Computer Programs

Two Idaho Counties, both users of IBM System 3 equipment, have agreed to swap programs to save time and money. Officials of Ada and Canyon Counties report success with the plan.

Canyon County has automated its court procedures and traffic fine collection. These were then added to the Ada County system, which had been developing several tax programs for use by both counties.

Ada County plans to automate the preparation of tax statements, billings and car license information, as well as voter registration, election results, payroll data, and additional court functions. Canyon County will be offered the programs.

### Nasa Proposes Computerized 'Dial-A-Plane'

WASHINGTON, D.C. — The National Aeronautics and Space Administration (Nasa) is proposing a computerized scheduling system to provide better airplane service to small cities. Nasa contends that while airlines serve major cities well, travelers in less populous towns have to contend with infrequent flights and lengthy connections.

Nasa is studying what it calls "Dial-A-Plane" service to accept telephone requests for air flights. The computerized service would minimize trip length and passenger waiting, and pick the best aircraft for a flight. The service would recommend connections between short haul airlines and air taxi operators and long distance air systems.

### Xmas Wreaths Don't Help Restore Tapes

PHOENIX, Ariz. — The Christmas spirit came just a little too soon for the Arizona Finance Department.

Gayle Hodges, director of the accounts and control division, reports that early this month one of the department's magnetic tapes was accidentally erased, and when it came time to redo the tape, it was discovered that about 2,000 of the data processing cards on which the necessary information had been stored were missing.

A careful search turned them up. They had been folded, spindled, mutilated, and made into colorful gold Christmas wreaths.

## One Sleepy RR Stop Gone

# On-Line System Stirs Station

Special to Computerworld  
KENT, Wash. - Railroad Ave. runs through a decaying edge of the business district here.

Located a few miles south of Seattle, Kent, like most other cities in America, has grown away from its railroad system, both physically and economically, but now computers have arrived.

About 40 freight trains rumble through daily, headed for Portland, Ore., a half day away; and six times a day, a short passenger train disturbs the tranquility of once-important Railroad Ave.

There are signs of new life around the little railroad depot. Fresh yellow paint has restored some of the lost dignity of the stucco and brick building, and the new evergreen plantings are a symbol of the transformation occurring within the building.

Step through the door marked "Office," noticing the green and white Burlington Northern decal on the door, then look around.

Where are the waiting room benches, the vending machines, the wire-caged offices of years past?

And then you notice it - the low humming noise of electronic equipment. Over there, past the sturdy old safe which still says "Northern Pacific" on the door, is a room packed with an IBM 1050 terminal system, printer, and keypunch.

That room is one of the first installations of Burlington Northern's new \$30 million computer system, the Complete Operating Movement, Processing and Service System (Compass), which will eventually tie all local stations like Kent into the computer center at St. Paul.

With Compass, the location and movement of every freight car on the 24,000 mile system will be monitored. Local station agents will be able to input car movement data, as well as check their local yard inventories and inquire about incoming train makeup.

And that's where Bill Brandenburg comes in. Bill is the station agent in Kent, and has been for a number of years. The new system makes his job easier - an employee can gather information in two minutes that used to take half a day and dozens of phone calls - but still, he liked the old way better.

"We knew what we were doing, then," he says. It's obvious in talking to him that the new system makes him uncomfortable.

When he talks about the card racks used in days gone by for the same purpose, there is confidence in his voice.

When he presses the keys on his 1050 and sends off an inquiry, he stumbles a little over terminology, and he seems uneasy about what response the system may make.

But there is pride there, too, at the wealth of information available to him at the press of a button. He runs off a yard inventory, and explains the significance of the cryptic symbols. Time will restore his confidence, you can tell.

As you look around the office area, there is more than just the

electronic hum to remind you that there's a new way to run a railroad. Flow charts and deck setup instructions are hung on the walls.

A rack of IBM cards stands against one wall, and boxes of special forms are stacked in a corner.

There are other changes. The station is now open seven days a week, not five as before. The payoff to Burlington Northern, of course, is measured

in efficiency and dollars - improved service to shippers and more effective distribution of empty freight cars.

But the changes in the little stucco building alongside Railroad Ave. seem more significant than just efficiency and dollars - fresh paint, evergreen plantings, and the low hum of electronic equipment seem to signal the end of a period of decay, and the beginnings of a chance for new growth.

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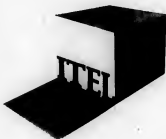
For instance, ITEL's Monolithic Main Memory Extensions, available for both the IBM/360 and 370, are of fourth-generation technology at significant cost savings over IBM prices. (This exceptional add-on is manufactured to our specifications by Advanced Memory Systems, Inc., Sunnyvale California.)

Similarly, the ITEL 7330 disk drive subsystem is plug-to-plug compatible with IBM's 3330 on all IBM System/370's and is actually a whole new level of high-density disk capability, in terms of both speed and capacity. Built by ITEL/Information Storage Systems, it uses standard 3336 disk packs and has 800-million-byte capacity per subsystem.

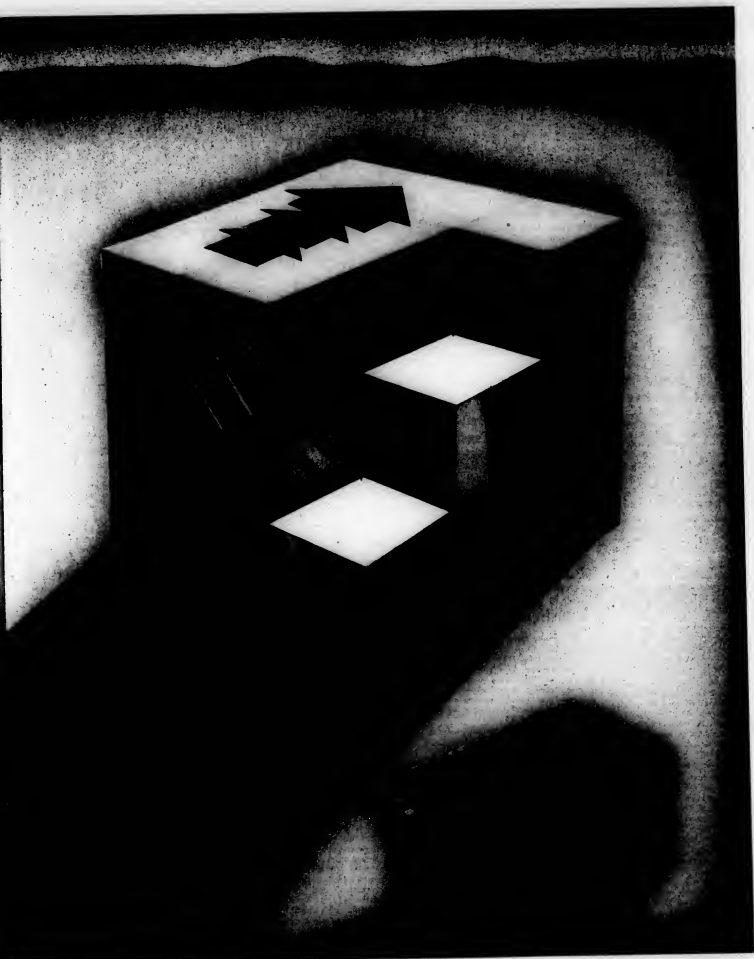
But what about service? ITEL has it. Economically, from a nationwide, on-call staff. A trained, qualified organization, skilled in servicing everything from IBM mainframes to add-on memories, disk drives, and other peripherals.

It comes down to this: ITEL gives you the in-depth experience of data processing and financial professionals. Strong technical capabilities and proven superior products. Follow-on service that means you needn't worry about service. When you are considering any data processing change—new installation, upgrading, or cost change—get in touch with ITEL.

ITEL's people and ITEL's products will show you our expanding solution to today's computer system costs.



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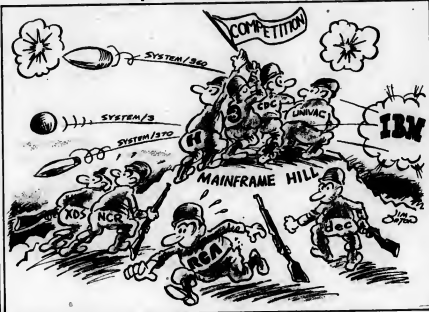
## Editorial

## Wishful Thinking

What do we wish for in 1972? We would like to see a career in data processing live up to the public's rosy view.

More than 70% of the public, according to the All-Time national survey, believes that jobs in the field are: Good for women (87%), good opportunities for high level professional people and scientists (81%), interesting (80%), high salaries (72%), challenging for very smart people (75%), and secure (73%).

With the exception of the free acceptance of women, the field used to match these expectations. Let's hope it will live up to all of them before the new year ends.



## Letters to the Editor

## The Real DP Counterfeit Could Be the Recruiter

As one who has held managerial positions in EDP for over 14 years (in line and staff capacity with a major computer manufacturer; as a corporate director MIS with line control of eight data centers; and as a management consultant), I feel compelled to address myself to the other side of the article "Beware the 'Counterfeit' DP Executive: Recruiter." To wit: "Beware the 'Counterfeit' DP Recruiter."

To begin with, rarely, very rarely indeed, does one find a DP recruiter who has successfully (if at all) held the position(s) for which he is recruiting.

In the same rare strata is the recruiter who can give a prospective candidate any in-depth or meaningful background on the responsibilities and duties of the position for which he is recruiting; ditto on the overall EDP organization of the client; the overall organization of the client; and most important, the reputation of the client company vis-a-vis recognition and environment for job satisfaction.

At the detriment of competent, capable EDP managers and directors, all too many of the DP "recruiters" function as clearing houses wherein their chief skill (and hope) is to reproduce and mail as many different resumes to as many potential clients as possible. And all this highly "specialized" service is for only 10% or more of a candidate's annual salary.

It is doubtful that these "recruiters" would depart from the old cliché... the resume... and attempt to explore what a man is capable of doing, rather than what he has done, or equally sacrosanct, probe the candidates ability for motivation, innovation, or leadership.

I submit to you, Kurt Einstein that more shocking than technicians who pose as administrators, are self designated "recruiters." As for his comment about the trend toward financial executives and other generalists heading DP operations, Einstein must be expressing a personal opinion; or revealing the true cause of EDP inefficiency among companies within his realm of experience.

I submit to Einstein that the real counterfeit to beware is the counterfeit who hires the counterfeit. There is no such animal as an extremely bright counterfeit; only those who can be classified as medi-

ocre, obsolete or insecure. Joseph Fiore and Associates New York, N.Y.

## Most 'Glorified' Programmers Are Inefficient Managers

Kurt Einstein tells it like it is in his article about the "Counterfeit" DP Executive. Many times I have been in medium or large computer installations, and too often have observed the DP manager giving an impressive demonstration of the dexterity of his fingers and feet as he threads tape, etc.

This is not intended as an indictment of the professional manager or a working supervisor. It is aimed at the "glorified" programmer or operator who has acquired the title of Manager or Director of

Data Processing.

Put that dexterous manager behind his desk (cluttered with old print-outs, reels of tape, etc.) and talk to him about ways to save money. He has two cost figures at his fingertips - total salaries and machine rental. This to him is his in-house cost.

Talk to him about fringe benefits, floor space, non-productive time, work load fluctuation and overtime, corporate indirect costs, cost of errors and reruns, and he is lost. To him this is left up to the accounting department. Why should he be involved?

Check his daily calendar and see if it is at the current date. This is an indication of how the ship is run - always behind schedule.

It is rare to find a technician who will make a good manager - a real manager. It is likewise rare to find a good manager who is technically capable.

I wonder if the president of any of our large manufacturing corporations is able to use a wrench or thread a nut onto a bolt?

Ray Bird

Oak Lawn, Illinois

## CDP Versus Snobishness

I refer to the letter in the Dec. 15 issue from James Bradley which belittles Gerald McKernan's request for a definition of OEM on the grounds that CDPs should know better.

See! The credential already discriminates between an intellectual snob who confuses data with knowledge and a sincere enquirer who wants to know more.

Stephen Burkard, CDP

President

Systems, Inc.

Langham, Md.

## 'Smokey' the TGR Bridges Communications Gap

By Miles Benson  
Special to Computerworld

Once upon a time, in the far old land of Computerdom, there lived a proud and busy people. They were proud because each and every one was a Computer Type. As Computer Types they worked in the most exciting, new and mystifying field of their time.

They were busy because the Computer, which they all served, was a voracious beast, and demanded their constant attention.

Now, the Computer Types of Computerdom were divided by birth, training and inclination into two castes: Computer Type A's, also known as "Managers," and Computer Type B's, known as "Technicians."

It was a democratic society, and Computer Type A's and B's mingled together in both their business and social worlds, and communicated with one another and sometimes even considered intermarriage.

In fact, Computer Type A's were often Type B's who had grown older, or wiser or perhaps some combination of the two.

If there was one characteristic which distinguished between the two castes more than any other, however, it was communication. Computer Type A's, who were often gregarious and verbose by nature, spent long hours in communal gatherings called "Meetings," discussing and occasionally solving the problems of

Computerdom.

Computer Type B's, on the other hand, were often loners who spent their long hours hunched mournfully over peculiarly stacked reams of paper known as "Computer Output," often clapping their

## DP Sociology

hands together in woe and chanting softly to themselves.

Mournful lonerism begot mournful lonerism, and both the vocal chords and read/write heads of Computer Type B's began to atrophy, to the point where they communicated infrequently and documented almost not at all.

In time, this communication void began to have a serious impact on the productivity and stability of Computerdom. Computer Type B's, in the absence of any direct communication with one another, rarely improved themselves by learning from each other, and often duplicated one another's work.

One fateful day, two Computer Type B's inadvertently bumped into one another and were forced to communicate. "Scuse me," said the first. "Mmmmm," said the second. The discussion proceeded from there. They discovered that there were 333 separate matrix inversion subroutines in the land, all of which used the same obsolete analytic technique and were coded in Fortran II.

This was too much. The future of Com-

puterdom was at stake. "A savior must be found," said all the Computer Types to one another, "a savior who will lead us back into the paths of communication."

And into this void there did stride a savior, a Computer Type B who was determined the communication barrier must be shattered. He was the legendary Smokey the TGR (Technical Group Representative), a nearly-mythical being who lived, breathed and perspired communication.

Instigating, organizing and documenting prolifically, Smokey the TGR singlehandedly attacked and destroyed the communication barrier, in the manner of Joshua and the walls of Jericho. "Pow," "Zap" and "Kerbang" echoed throughout the land as he went about his work.

He is best known for his famous, cleverly titled book, "The Thoughts of Smokey the TGR." Scathingly brilliant, and occasionally even profound, it includes such eternal proclamations as "help stamp out bad data, a microsecond saved is a microsecond earned, fight life with file, machine independence is anarchy, only you can help prevent unresolvable ambiguities," and "in OS learned by OSmosis!" This great savior is now revered throughout Computerdom, where he is often found in statue form or on billboards, his erect body covered with fur, his distinctive hat slightly askew, his shovel in hand and mouth open, communicating even in effigy.



# A New Year's Wish for Mr. Noel, and Other Readers

1972 marks the 21st year of *Business Data Processing*. Business Data Processing is different from *Scientific Data Processing* in the manner in which it is affected by ethical considerations.

Whether a scientist should personally involve himself in the use or abuse of his own discoveries has been an issue that plagued science through the centuries.

The problem scientists faced was that scientific knowledge, once gained by anyone, is hard to suppress. The refusal by one scientist to perform a particular job, because he distrusted the end use, was rarely effective. Someone else could do the job, gain the knowledge, and the damage would be done.

## The Report

by

Alan Taylor, CDP



There seemed to be no such problem in *Business Data Processing*. Indeed, *Business Data Processing* appeared to be a simple continuation of the normal operations of business firms, with the computer as a glorified clerk. It seemed powerful yes, indispensable yes, but not irresponsible.

This assumption of a lack of ethical problems grew with the industry. Computer people came to be interested in the arrange-

ment of operating systems, but not in the uses to which their programs were put.

A typical programmers' comment was "I like to write elegant code, and as I am not responsible for computer operations, I cannot get excited about the efficiency of my programs."

Like others, he had been brainwashed by the phrase, "The programmer need have no concern over..." used so frequently by manufacturers and computer professionals alike as they extolled the virtues of new hardware and software systems.

And yet, outside the field, understanding of just how serious the responsibilities of *Business Data Processing* were was spreading. The popular press picked it up first.

In 1959 they were introducing headlines such as, "Computer miles rent for apartment dwellers." Unfortunately, inside the field this just gave rise to disdain at the reporter's ignorance, or to a poppley at the dangerous way they were blaming a poor, innocent, piece of hardware, or a poor systems analyst for doing what they were told to do.

Despite this external understanding of the damages of irresponsible programming, and despite the growing unrest in management about DP costs, professional responsibility appeared to look as though it would always be neglected within the industry. Only two years ago, when I started writing "The Taylor Reports" there seemed little or no chance of conscious

"So, to Mr. Noel and to all readers, a Happy New Year with the hope that 1972 may be the year when it will become professionally respectable to be professionally responsible."

tive action to improve its status.

I felt the matter was sufficiently important that something had to be done. This column for the past two years has taken up various cases of computer ridiculousness, arrogance, and irresponsibility.

We have discussed:

- Systems analysts who did not consider what the output looked like

- Programmers who did not care about cost of their programs

- Manufacturers who provided only poor or incomplete specifications

- Using departments who did not want to be bothered with the problems their programs were creating

And the writing has been in a semi-humorous, gaddy, style.

Writing in this style has been amusing. It has allowed the humor of the slightly ridiculous to act as the sugar coating over the pill. But the sugar was there primarily because the industry had not developed a professional attitude, that would condemn such errors.

It had not even developed the beginnings of one!

New Attitude Appearing

This is no longer so. During the past few months the signs of a new attitude have begun to show. It has not come primarily

from the sophisticated leaders of our technology, but rather—as often before—from the common work-a-day-man.

It was the lay magazine *Time*, rather than one of our professional journals, that collaborated with AFPS in discovering the millions that had difficulty in getting their computer billings corrected, and that most people believed we should have government looking over our shoulders as we work.

It was the small *System 3* users, rather than those with large Model 65s and 1555 that founded a really independent user organization.

Even within the establishment things changed. The ACM Ombudsman program, originally set up in 1970 (as a result of one man's objection to outsiders blaming the computer) is now developing into something rather different, and may well become one of the most powerful and effective tools available to the profession, and to the country.

CDPs and Tape Users Organize

Within this column CDPs showed their interest in pushing professionalism forward, as did the Boulder Valley Tape Users, mentioned only last week when they formed a center.

In fact the basis of the column's philosophy—which had been that there simply was no organization taking a serious interest in the responsibilities of

professionalism—was simply no longer true.

It would, of course, have been possible to continue the column as it was. But now that we can talk about things more openly, I think it may be more useful to somewhat change its aspect. The gaddy approach used to date has been useful, but may not be necessary now.

New Style in Column

So this is the first of a new type of "Taylor Reports"—one, which lays aside both the jester's cloak and the gaddy's sting. Please do not be misled—I still want to hear about all the bad and dubious computer users.

But I do not expect to be writing tear-jerk headlines quite so frequently.

In some ways I will miss this. For instance, I have been waiting for months for a second letter from IBM DP Marketing Vice-President W.L. Noel, primarily because I might then be able to start a headline with the words "The First Noel..."! It does not look possible now that Christmas is past.

So to Noel and to all readers, a Happy New Year with the hope that 1972 may be the year when it will become professionally respectable to be professionally responsible.

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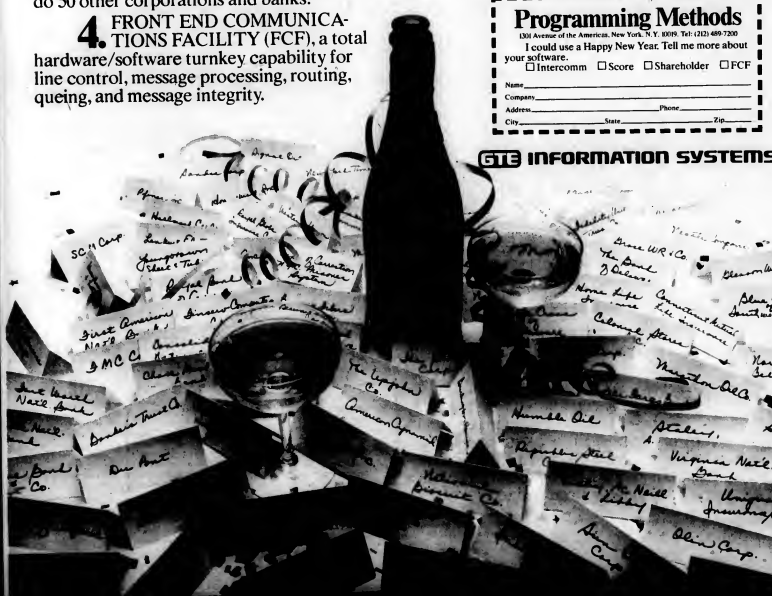
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# COMPUTERWORLD



1971 in Review

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December 29, 1971-January 5, 1972

## Purchase Probably Profitable

# Univac's Purchase of RCA Should Comfort Users

To the 650 users of some 1,000 RCA computers in the U.S., Univac's purchase of RCA's customer base is comforting. During the two months between RCA's announcement and the Univac agreement, users had seen their salesmen, maintenance engineers, and software contacts disappear one by one as RCA laid off more and more of its staff.

It is far from a perfect situation, though. Univac will have at most 2,500 of RCA's staff, and users will have to go through the tedious process of developing personal contacts with the vendor once again.

### How to Convert

One of the main reasons Univac took over RCA's business is the eventual conversion of the RCA user base to equipment manufactured by Univac. This will not be an easy chore.

The closest point of contact between the two lines of hardware is Univac's new 9700. When it is released in about a year, the 9700's OS-7 operating

system will offer source language compatibility with IBM 360 DOS programs written in Cobol, Fortran, BAL, and RPG.

The RCA machines, of course, are quite similar to the 360s, and even have a 360 mode of operation. OS-7 may be the upgrading solution for RCA real memory users—who want a computer in class—the \$17,000/mo to \$42,000/mo class.

Those users who have committed themselves to virtual memory, and those who want a different size machine, however, are going to have to wait for more developments from Univac.

Software conversion packages, emulators, and expanded operating systems appear to be more likely than new computers to extend the Series.

The Money Should Be There Univac will be able to carry on some of the user support through its own resources, and has said it is willing to take up to 2,500 RCA people in addition.

These 2,500 people would indicate an increased annual expenditure of \$50 million to \$75 million.

It is also fairly well known that before Sept. 17, RCA's installed base was generating something in the area of \$140 million a year. It is not clear whether this amount has increased or decreased since the announcement,

but it is obvious that it will drop rapidly over five to seven years. Over the next two years, though, it may well produce revenues of \$250 million at a cost to Univac of about \$100 million to \$150 million in new personnel, and \$100 million plus in payments to RCA. Over three years it may well show a profit. So it seems that Univac doesn't

stand to lose any significant amount by the deal. Anything it makes will depend on how well it can convince people to stay with their RCA machines — that is by providing new operating systems and eventually better hardware — or to convert to Univac equipment — that is by showing users the exemplary service available from Univac.

## Users Install New Generation of CPUs; Manufacturers Announce a Few More

1971 was a year of catching up from the mainframe point of view. The mainframe announcements of last year turned into working equipment with deliveries of the first 370s, 3330 disk drives and 3211 printers. The new equipment represented, for the most part, expansions and enhancements of existing devices.

The IBM System 370/135 announcement surprised very few

customers by fitting in so neatly between the 370/145 and the System 2. It introduced a money saving option, the built-in Integrated File Adapter which can be paired with the Integrated Communications Adapter on this model.

The user found well in his quest for more economical processing power, due in part to a series of price cuts made by IBM, who started offering out-of-production items such as the large core storage, models of the 360/22 and the 360/44 at bargain prices. This was followed by the availability of the 360/22, a thinly disguised, stripped-down model of the 360/30, and the 360/20 model 6 that seemed to be a somewhat limited model 5 at lower price.

The IBM System 3 continued to receive a goodly amount of IBM's attention. The Model 10 was granted a larger capacity disk drive using the familiar 2316 pack on 2314s.

The availability of the 1403 printer, although at a healthy price, eliminated many users' objections to the small system, as did the announcement of the availability of Cobol and Fortran.

The greatest objection to the System 3, however, was elimi-

nated later in the year by the availability of 96-column card equipment for the System 360 and the announcement of magnetic tape equipment for the System 3.

This allowed many users to see the small computer as part of a large multi-level data processing system for the first time. The addition of terminals to the list of System 3 peripherals also helped by allowing use not only as a standalone system or remote terminal, but also an intelligent network controller and data concentrator.

Univac's after its concentration last year on the 1100 series, this year paid closer attention to its 9000 series business-oriented systems. The computer pioneer made available models of the 9400 system with up to twice the main memory capacity that could be had before, and an announcement, making the medium power system more attractive to customers that might be considering some more recently announced equipment.

The company also started to make the customers' choice easier by offering pre-packaged special purpose systems in the 9200 and 9300 series.

The entire series received a shot in the arm with the announcement of the 9700 with cycle time in the nanosecond range and megabyte memory capacities.

Univac's influence on the former GE product line became more obvious with the announcement of the 6000 series of computers. These are basically 600 series systems with the addition of full decimal handling capabilities designed to make the time-sharing-oriented system appeal more to business users.

The Control Data Cyber series continued what seemed to be the industry trend of announcing new equipment that was not quite new. The Cybers are enhanced versions of the Control Data 6000 series system and the company's 7600.

Burroughs came out with the latest of its 700 systems, the B4700 that is designed to take up where the B550 left off. The new system, which can be equipped with up to four processors, can reportedly process Fortran up to 20 times as fast as the B3500.

## UCC Programmer Charged With Theft As 1971 Witnesses Birth of T/S Piracy

One of the long-standing fears of the computer industry became real last year — theft by time-sharing.

Early in March, police raided a University Computing Co. office in Palo Alto, Calif., and discovered a printout that was allegedly a plotting program proprietary to a UCC competitor, Information Systems Design. A UCC programmer was arrested and charged with theft of the program.

ISD also entered a civil suit against UCC asking \$6 million in damages. ISD claimed that the programmer using the ID number of a mutual client, illegally accessed ISD's 1108 to take the plotting program.

ISD said it had discovered extraneous punched cards in its output. Suspecting something fishy, it then searched telephone company charges and found an access call had been placed from the UCC office. Tapping the line led to identification of the tapper, ISD said.

Legal prosecution of the situation has led to two interesting developments. The first is a test of a 1967 California law that ideas, as well as physical property, can be stolen; the outcome of the civil and criminal trials may set a precedent.

The second is that the trial does not seem to be concentrating on proving the UCC programmer did indeed steal the plotting program, but rather on whether the plotting program was a trade secret.

The programmer's attorneys are claiming that ISD had pub-

lished the name of the program, removing its proprietary nature, and placing it in the public domain.

The outcome of the trade secret issue will certainly be important, of equal importance to computer users, though, is that a time-sharing computer was raided, somehow and by someone.

This case wasn't the only computer piracy revealed in 1971. In Chicago, a policeman was indicted by a federal grand jury for tapping the FBI's National Crime Information Center computer to get information for

private use. The policeman allegedly pulled the dossier of a financier and passed it on to his brother-in-law, a lawyer who was considering taking on the financier as a client.

And computer tampering was said to have been necessary in the theft of 217 Penn Central Railroad boxcars. The cars were discovered on the tracks and yards of a tiny Illinois railroad. According to attorneys, someone "had to put the fix" on the Penn Central's computers to shuttle the boxcars to the railroad and to "make them disappear."

## Ervin's Senate Committee Highlights Growing Privacy Invasion Concern

Lots of people talked about computers and the individual right to privacy last year, but other than Congressional hearings, proposed legislation, and the filing of a law forcing tax preparers to keep their clients' files confidential, there wasn't much done about it.

The star of the year was civil libertarian Sen. Sam J. Ervin, Jr. (D-N.C.), whose Subcommittee on Constitutional Rights pressed the dangers computers present to privacy.

Testimony before the committee spotlighted military surveillance of civilian political activity; the computerized dossiers kept at Ft. Holabird, Md., by the Army; data banks within the

Dept. of Health, Education, and Welfare and the Justice Dept. — in particular the Social Security Administration and FBI files — and the files maintained by local draft boards.

Ervin filed a bill to protect federal agency employees from invasion of privacy, prohibiting requirements that employees disclose their race, religion, or national origin, or submit to questioning or lie detector tests about their religion, personal relationships, or sexual statistics.

In the House, Rep. Cornelius E. Gallagher (D-N.J.) was stripped of his power to probe privacy invasions as the House invasion of Privacy Inquiry was headed by

Inquiry for six years. An activity of the House Government Operation Committee, the Privacy Inquiry was dropped along with the Inquiry on Consumer Affairs in what Committee Chairman Rep. Chet Holifield (D-Calif.) called a reorganization.

Gallagher appealed to the House to establish a select committee on privacy, human values, and democratic institutions.

One of the few substantial actions to come out of Congress on privacy was the passage of a bill containing a section forbidding tax preparers from using or selling the confidential information their clients give them. The amendment to the tax bill was submitted by Sen. Charles Mathias (R-Md.)

## T/S, Other Vendors Grow

## New Product Classes Spark IBM Software Advances

1971 was the year many users began to feel the impact of IBM's two-year-old decision to charge for software and for systems engineering support. But it was also the year the unbundling "ground rules" were changed in stressed situations by the great gray giant.

Meanwhile, users began to acquire a wide range of packages from independent vendors to enhance the software provided by hardware vendors. At the same time, they found many time-sharing vendors had matured enough to offer capabilities that could not effectively be implemented on in-house equipment. IBM distributed, without cost to users, Language Conversion Programs (LCPs) to ease the transition from the free Cobol II to the unbundled ANS Cobol compiler.

It agreed, halfway through the year, to provide free on-site systems engineering support for users of the Class B Program Products, primarily application packages.

The Application Customizing Service (ACS) for System 3 users was extended so that, under separately priced options, it would provide RPO-II source code, as well as the program logic charts that were the normal output of ACS. The most advanced option provided SE-supervised, multi-step debugging and modification of the source code before it was delivered, all for predetermined prices.

IBM also established two new classes of software, each of which provided use of packages in the class for definitive, maximum rental amounts, rather than the continuous month-in, month-out license fee required of the normal unbundled Program Products.

Licensing fees covering the use of Field Developed Programs (FDPs) are waived after the first 12 months of use, IBM said, but terms of the standard licensing

agreement remain in force as long as the FDP is in use.

Monthly charges are also waived, and licensing agreements continued in force, with installed User Programs (IUPs); but the point in time at which charges are waived vary from program to program in this classification. In return for the limitation of either FDP or IUP, users are provided little if any programming support for these classes.

Software packages from the independents included operating system modifications, several completely developed language processors, source code generators, data retrieval systems and utilities.

On the nets, previously announced nationwide services became reality this year. On-line program debugging systems and full-scale applications, coupled with improved response times on inquiries and delayed processing options for remote batch work, tended to help close the gap between classic "problem-solving" time-sharing and DP done in-house.

The independents' DOS/360 operating system enhancements were generally geared to providing "spooling" or intermediate

storage of printer or punch output, relocatability of program between partitions, or accessibility to job accounting statistics. One package, Grasp from Software Design, had options added during the year so that now it includes all of these features.

One of the first of the independent language processors being distributed this year was a Fortran IV described as 10 times as fast as IBM's by its developer, Nanwak Corp., Williamsville, N.Y. Another independent, DP&W Inc., Boston, announced a 44K Assembler FX as a "plug-in" replacement for IBM's D00 Assembler F, which lost its centralized program support in 1971.

## IBM Cheapsens Peripherals, Ups CPU's In One-Two Punch at Independents

1971 was the first year in recent memory that IBM was forced into playing games with its pricing structure to keep revenues at high levels and stave off competition.

The good news for user — it was bad news for independent peripheral competitors — came

Early in the year IBM announced that it would have Fortran for System 3 by August, 1972, but Programmatica beat that date by a year with the release of R-Fort.

Cullinane's Standard Programming Language (SPL) package was among the more spectacular of the source code generators. By altering a control code in the input cards, users could generate either Cobol, BAL or PL/I, the firm claimed.

The Metacolib Cobol preprocessor from Applied Data Research provides users with a macro capability similar to that available under BAL, which eases

half way into the year when IBM announced across the board price cuts of 15% on all purchased 360 and 370 tapes drives, disk drives, and printers.

At the same time, IBM offered rental customers new fixed term lease plans of 12- and 24-month on peripherals, which slashed

problem solving logic coding.

The Synchronized Sort from Whitlow Computer Systems Inc., Teaneck, N.J., could handle OS sorts of fixed length records in less than 18 min of IBM's SMI or SM-023, the company said.

Sort/merge packages also became available for what some mini-computer users. The DEC PDP-11 gained sorting capabilities for example, with a package from TLM Systems Associates, Wakefield, Mass.

Rhombic Research Inc., Ft. Worth, released a sort/merge that could be used on Data General Novas or any other 16-bit mini.

user bills by 8% and 16%, respectively.

IBM had been started late in the month, when the firm reconfigured maintenance rates, cutting the extra-hour maintenance premium and raising the per-call hourly maintenance rates.

The bad news got worse the next month when the firm increased the rental prices of the CPUs by about 4% and upped the rental and purchase prices of 370 CPUs and the 2880 Block Multiplexer channel by 8%. The firm also jumped the maintenance rates on 360s by 20%.

The news was also bad for smaller users, when purchase and rental prices of the 11 submodels of the System 3 Model 10 and System 3 peripheral prices rose by about 6%.

Users who rented their equipment directly from IBM got a reprieve a few weeks later, when President Nixon announced a freeze on price increases which prohibited IBM from raising its rental rates.

## Competition Force Reduction

Most industry observers agree that IBM was forced into the peripheral price reduction due to competition from the independent peripheral makers who were nibbling ever larger pieces from the IBM installed equipment base.

When the peripheral market had garnered over 10% of that base, observers said, the giant reacted with the reductions.

According to IBM, the price changes would result in less than a 3% effective increase in systems costs, although the range will be from 1% to 6%.

The price increases were made to make up for the loss of revenues caused by the reduction of peripherals prices a month earlier, several sources indicated. IBM just said they were due to the "increasing costs of doing business." The peripheral price reductions had been said to cut systems cost by up to 5%.

The net effect of the pricing moves by IBM was to leave users with around the same price tag for the same installation on New Year's day 1972, that they had the previous year.

## Independents React with New Products To Sterner Competition From IBM

1971 offered users a chance to take advantage of a see-saw battle that has been taking place between the independent peripherals manufacturers and IBM.

The first development was the announcement of price reduction of 2314-compatible drives by several independents in response to the IBM 2319 three-drive "bargain" late in the prior year.

Telex chose the beginning of the year to bring out its 3430

replacement tape drive.

Not long after, Calcomp brought out the first of what turned out to be a veritable flood of independent high-density disk drives. That company was soon joined by Marshall, and later Amper, Control Data, Memorex and Telex in offering a user twice the spindle capacity of the 2314 at prices that were a better value.

The dual-density units were more or less intended as a halfway measure between the 2314 and the 3330. Replacements for the 3330 were not long in coming. Memorex was the first to announce a direct replacement device. Telex was not slow to follow with its announcement. Potter stole a march on the others by having its 3330 replacement connectable directly to the IBM controller.

The 2314 user was not neglected by Bryant announcing its replacement and Potter offering an improved version of its device, both time using a voice-coil actuator.

The interest in memories continued this year, with manufacturers offering substitutes for main memory as well as for large core storage units. The use of these add-ons enable the user to extend the memory capacity of his 360/30 or 40 beyond the limits allowed by IBM. One user reported that the solid-state add-on attached to his 360/30 improved performance very nearly at the 360/40 level.

Magnetic tape users were not neglected. Almost every manufacturer has announced replacements for IBM's new 3420. Telex announced a compatible replacement for the 3410 that would be delivered before the

IBM device that it is replacing would be in the user's hands.

The latest mag tape drive from Storage Technology offers a faster tape transport than any IBM tape drive to date with tape speeds of 250 in./sec, 25% faster than the IBM 3420 Model 7.

## 12 Ombudsmen Surpass ACM's Goal for Year

NEW YORK — A dozen computer ombudsman — advocates for people in trouble with computers — were put to work last year by the Association for Computing Machinery. The number far exceeded early goals established by Walter Carlson, ACM president, who had said he was hoping for three active ombudsmen by the end of 1971.

A report delivered to the ACM council, however, listed many successes in working with Better Business Bureau (BBB), stating the experience in Indianapolis had been "outstanding."

An all-day seminar was given by the ACM chapter to the 13 members of the Indianapolis BBB, and they now are sending a training council meetings, bringing questions and problems that are arising during the month.

In other cities ACM is conducting a training official to conduct two-day briefings of new ombudsman-designates. These members are charged with discovering the true cause of computer related errors, and with informing the public of the cause and assisting in rectifying the situation when possible.

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## New 72: Elementary Numerical Analysis

with Programming

Gerald B. Haggerty, University of Rhode Island. Emphasizes programming calculated on an IBM/360 model, using FORTRAN IV. 1972 Est. 476 pp.

## New 72: OS/MVT

Ivan Flores, City University of New York. Explains IBM's Operating System: Multi programming with a Variable number of Tasks. 1972 Est. 272 pp.

## New 72: Computers, FORTRAN IV, and

Data-Processing Applications

John Koro, Eastern Michigan University. Acquaints students with the fundamentals of FORTRAN IV and with typical applications in electronic data-processing. An Instructor's Manual is available. 1972 Est. 348 pp.

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## MCI Opening, DAA Alternatives, Higher Rate Plans Keep Bell and Users Active

The communications year was highlighted by the inauguration of MCI service between Chicago and St. Louis. In other areas, attempts to solve users' interconnection problems, and proposals to charge discriminatory higher rates to data users led the communications news.

In addition to providing its new customers with almost unprecedented reliability, the MCI service marked a milestone in communications. The old joke about not liking the available phone service and going to the competition was now a distinct (but limited) possibility for a few data users on MCI's first route. As the interconnection tariffs allowing users to install their own modems went into their third full year, it became clear that the necessity for DAAs was far from settled. The FCC called for a modern advisory group to study the issues.

A possible alternative method was introduced by an independent when the Rochester Telephone Corp. proposed a simplified interconnection system based on its Network Protective Device (NPD).

During a long set of hearings, the Rochester scheme was opposed by AT&T as "seriously deficient," while being approved with modifications by the New York Public Utilities Commission staff.

While the PUC staff favored

the idea of allowing users to interconnect, it opposed the creation of a separate class of Customer Owned and Maintained Equipment (Come) users.

The Rochester system was still pinned at year's end. The Bell system recommended a "Taxi-meter" Data Exchange tariff for data users because of Bell studies showed that phone system overloads had been caused primarily by the time-sharers.

But in December, Pacific Telephone & Telegraph, together with other phone companies and users, told the commission that there was no evidence to point an accusing finger at the phone usage of the time-sharers, or any other group.

So while special rates for data users were generally stalled in the various regulatory hoppers, many users continued to regard such discriminatory rates as a long-range Bell goal.

In line with its policy of trying to meet data users' needs, AT&T announced a new Data Under Voice plan, which would become the backbone of its digital data network, scheduled for initial operation in 1974.

Of immediate concern to users, an AT&T plan to put protective devices on private lines (DAAs are now needed on dial-up only), was postponed for a year by the FCC pending further proof of

need by the carrier.

Opposition by data users was a factor in the commission's order. On a more positive note, Bell allowed the use of multiplexing on wideband private lines and a few innovative users like Bankers Trust in New York were quick to take advantage of the new offering.

As Picturephone service was introduced in Pittsburgh, one user, Alcoa, developed a data retrieval system that allowed executives to access data from a 360 onto their Picturephone screens. Demonstrated on an experimental basis at the FJCC in Las Vegas, the system was considered the forerunner of future management information systems.

## Freeze Slows Price Plans

The end run of wage and price freezes in President Nixon's economic game plan caught computer users and the industry by surprise.

The play froze all wages and prices to the level in effect before the Aug. 15 announcement.

Some computer users got a break in the form of a two month reprieve from price increases planned by IBM and other main-frame manufacturers.

During the first phase of the wage/price operation, the rental increases planned by both IBM and Univac had to be rescinded. But as soon as the operation swung into Phase II, the Price Commission allowed most of the IBM increases to go into effect.

Honeywell's planned increases were also allowed by the board. The Board has ruled on the Univac increases, and the firm, now digesting RCA to become number two in the business, has not even requested that the raises be allowed.

The freeze also gave a break to some data communication users, since Western Electric had planned a price increase during the freeze period that had to be rescinded until the freeze thawed. AT&T had also been applying for increases that totalled \$1,224 billion when the freeze was announced.

At the same time, purchasers of equipment got a break under the plan in the form of tax incentives to install new capital equipment with a life of over four years.

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### IBM a victim?

While the industry giant appears little the worse for its recent battles, users continued to "shop around" for DP bargains, and in the process became part of a trend known to CW readers as "users' liberation."

The results of this phenomenon were seen in many areas within the DP budget: peripherals, memory, training, and service.

It has been documented that users of independent peripherals were "highly satisfied," although fewer than one-third of IBM computer installations are estimated to have independent equipment installed.

Early last year, a "typical" 360/30 installation could save almost \$17,000 a year by using independent vendors, although price reductions in IBM peripherals have cut into these savings.

Another IBM user reported cost-effectiveness and increased flexibility by using outside training sources, particularly in the area of video assisted instruction (VAI).

United Air Lines educated almost 1,000 employees through VAI courses, and reported high satisfaction with "immediacy - offering the right course at the time the trainee is ready for it."

But the biggest target for the independents is obviously IBM. With System 3 becoming a popular computer for the small user, a group on the West Coast was formed for the purpose of opening the door to independent vendors of supplies and peripherals.

The National Association of IBM System 3 Users (Nasu) is headquartered in Canoga Park, Calif., and has chapters across the nation and in Canada.

The benefits of Nasu, as seen by president Irwin Cohen, include the ability to hear from independent vendors, to share software enhancements, and to be generally free from vendor (i.e., IBM) influence at the group's meetings.

Another user's group surfaced last year, although it had been in existence locally in New York for about three years. Guidance International became "affiliated" with IBM, and officials cited education as that group's chief benefit. Guidance uses IBM facilities for its courses, and recently reported over 100 registrants for an RPG course.

Nasu said IBM education is not a really significant benefit, and the two groups are carrying on a quiet feud over the relative benefits of affiliation. Cohen repeatedly insists any group affiliation with a manufacturer is a "manufacturer's group," not a user's group.

Users with equipment from leasing companies were "maintained" by a standard "maintenance-by-manufacturer" clause in their contracts when four leasing companies authorized an independent maintenance firm to work with the leasing customers.

The move is especially significant because it permitted a non-manufacturer to assume responsibility for maintenance and service, and enabled users to save up to 10% in this area.

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### Automated Cataloging

## 49 Schools Will Share Library Net

COLUMBUS, Ohio — Programs are being developed to facilitate the sharing of reading material by the 49 colleges, universities, and seminaries that are members of the computerized Ohio College Library Center. The project is expected to be completed early next year.

The center, located at the Ohio State University campus, is a non-profit organization designed to offer increased library services to faculty and students of member institutions at reduced costs and to foster the development of a national computer-based bibliographical network.

Last August, the center became the first organization of its type to offer automatic cataloging. More recently, it became affiliated with a central library processing center in Atlanta, which serves 18 southern black colleges. It is already affiliated with a Pittsburgh regional center serving institutions in western Pennsylvania.

Grants from the U.S. Department of Health, Education and Welfare and the Council on Library Resources, Inc. are funding development of the programs.

The center's automatic cataloging feature reduces the time required to catalog reading material by two-thirds and reduces the cost by three- to four-cents. When a member wishes to use automatic cataloging he accesses the system's XDS Sigma 5 computer through a specially designed graphics terminal. New catalog information is automatically fed to the growing data base. Philip Long, assistant director of the center, said that present library holdings of member institutions are being added by workers at Wright State University.

Though programs still in development will end order duplication, Long stated that members now consult the cataloging subsystem before initiating orders. Basis for the subsystem is the Library of Congress Marc II distribution service, which is available on magnetic tape. Information for library cards can be prepared in 6,000 different formats, and more than 10,000 are printed each night.

The system prevents duplicate cataloging, Long explained, and helps keep down the steadily rising costs of running a library.

Other programs still being developed should further reduce costs, Long added. An automated circulation and remote catalog access system will enable users at remote locations to telephone strategically located centers. Operators at the centers will use display terminals to supply users with information on reading material. The desired material can then be sent to the user, and he never has to go to the library.

### AFL-CIO Will Use DP To See What Members Do When Plants Close

WASHINGTON, D.C. — The AFL-CIO's Industrial Union Department has started developing a computer-based system to keep track of American manufacturing, particularly in the area of plant closings. According to Jacob Clayman, administrator of the department, the system's primary task is to keep track of union people, by attempting to learn how jobs are lost and where employees go after a plant closes.

Work on the project began several months ago using an outside software development firm and computer service bureaus.

However, Clayman said since the undertaking is unique, very little information is available on this subject.

#### Questionnaire

Information will be gathered primarily from member unions, Clayman pointed out, adding that a questionnaire is being developed for use by union locals. "Every time a plant closes," Clayman said, "the local can fill in the questionnaire and send it to us." In addition, Clayman hopes to obtain information from newspapers, magazines, and government publications.

The union department is presently working on several computer-based projects. It maintains files on collective bargaining agreements, National Labor Relations Board elections, and organizing patterns of member unions. It also handles special projects on request by member unions.

Besides generating information on plant closings, the union's latest undertaking might shed some light on job openings resulting from expanded exports, Clayman added.

#### 70th Birthday Is a Real Winner

DELFT, Holland — A former world chess champion, Dr. Max Euwe, of Holland, recently celebrated his 70th birthday by winning a chess match against a computer.

Dr. Euwe said the machine, which gave up after 51 moves, knew the rules but could not plan strategy.

December 29, 1971-January 5, 1972

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## Random Notes

### New Features, Manual For ADR 'Librarian'

PRINCETON, N.J. — A new release of the Librarian software from Applied Data Research (ADR) allows the user to store twice as many source modules on a disk as he could before and to copy parts of modules to create new ones. A global Scan allows him to search his library for all uses of a given term or data name.

The user's manual has been completely reorganized, ADR noted, to improve its usefulness. It now includes a full list of error messages and an alphabetic index.

ADR is in the Route 206 Center, 08540.

**Improved 'Nastran' Available**  
On McDonnell Douglas 360/85  
ST. LOUIS, Mo. — An advanced version of Nastran's structural analysis system has been installed on McDonnell Douglas Automation's IBM 360/85, and is available for client use.

The enhanced Nastran was developed and is owned by MacNeil-Schwender Corp., Los Angeles.

Nastran is used to analyze a structural model for static loads, buckling, vibrations, frequency and random response, transient response and dynamic stability. The new version analyzes solid elements and substructuring, as well as solving heat transfer problems and acoustic analysis of enclosures, McDonnell Douglas spokesmen said.

**CalComp Offers Software**  
To Access DS-12 From 1130  
ANAHEIM, Calif. — The DS-12 Support Software Package (DS-12/SP), developed by A.R.A.P., Princeton, N.J. and available from CalComp extends the IBM 1130 Disk Monitor to more fully support the CalComp DS-12 Disk Storage System. The software is said to allow dynamic access to the 20-million character capacity of the DS-12.

Described as fully compatible with both the IBM 1130 Disk Monitor System and user application programs, DS-12/SP is being distributed to installations leasing or purchasing the DS-12 from CalComp.

**Vending Machines Monitored**  
NASHUA, N.H. — Vending companies are able to keep track of daily sales, cash processing, product usage and inventory information by machine, location and route, with the Vending Company Information System recently released by Datavital Inc., 235 Main Dunstable Road, 03060.

Written in RPG using Index Sequential and Sequential Access Methods, the system operates on CPUs ranging from the 360/20 to the 360/135. The software costs \$15,000.

**Package Aids Budget Preparation**  
WARWICK, R.I. — Controllers are able to prepare monthly financial statements and control reports accurately and quickly on a 65K 360/30 with the Budget Preparation and Expense Distribution System from Information Sciences, Inc.

Made up of 19 Cobol programs, the system sells for \$10,000, which covers source programs, documentation and five days of on-site support. The firm is at 14 Jefferson Blvd., 02888.

## Cards Control Load-and-Go Reporting

By Don Levitt

CW Software Editor

KENMORE, N.Y. — No programming, debugging or compilation in the conventional sense are required to produce one- or two-page reports with the \$390 File Inquiry and Reporting System (Firs) from Dataware, Inc.

Controlled by parameter card entries, Firs is a load-and-go system that operates in 32K bytes of core on an IBM 360.

The system can work with sequential tape or disk files, but is described as "file independent" since the location, size and contents of data fields to be selected are entered each time Firs is used.

Firs handles standard labeled or unlabeled tape files, but requires fixed length records. Given the record size, the software performs any necessary deblocking on blocks up to 3,625 characters long, the company said.

### Fields Accumulated

Input data fields can be represented in display, packed decimal or binary mode. Parameter card entries define which fields are keys to breaks in the report, and which fields are to be accumulated.

Editing of numeric fields for the printer output is said to be handled without any need for user-provided parameters. Page

numbering is, likewise, generated automatically, but page and column headings are under user control, according to Dataware.

Firs is written in Assembler and Cobol. It requires two disks in addition to the device used by the input file, a card reader and a printer. The \$390 purchase price covers source decks and user manuals but no on-site installation help.

Dataware Inc. is at 3491 Delaware Ave., 14217.

## Tailored Accounting Functions Available in Month With 'Macs'

PHOENIX — Large scale in-house users and service bureaus are able to have any combination of six basic accounting applications operational within 30 days of installation of the Management Control System (Macs), according to the developer, Management Computer Services Inc. (MCS).

The first phase of Macs installation would normally be some combination of accounts payable, invoicing and accounts receivable, payroll and labor distribution, general accounting, inventory management and fixed assets accounting.

Modules which perform these functions are a part of a group of submodules, and each submodule performs a specific function. Users acquire only those functions they wish from the company, so the system is effectively tailored to each user's needs.

The user is not limited to the logic of the available Macs modules, however. He is free to integrate programs and programming he developed or acquired from other sources, the company said.

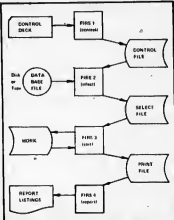
The keys to Macs, in addition to the applications modules, are the input processor and the central master file data base monitor system, the company said.

Written in Cobol to operate in 32K

under DOS or TOS, Macs is available for IBM 360, Univac 9400 and Honeywell 200 series equipment.

The total system, including all the submodules of the functional modules, the input processor and two months of on-site installation support costs \$75,000 on a ten-year lease.

An average installation, with only selected submodules, would cost about \$50,000, the company said from 1530 W. Indian School Road, 85015.



System flowchart shows the four phases of Firs processing.

## Novas Get Multitasking RTOS

SOUTHBORO, Mass. — Nova and Supernova minicomputer users with 4K words of memory are able to handle any number of real-time tasks simultaneously with the Real Time Operating System (RTOS) from Data General Corp.

The new system is independent of the company's Disk Operating System and will not support any of the language processors currently available. So, although several tasks can be run simultaneously under RTOS, they cannot include compilations or assemblers.

Users can create task handling logic of

unlimited complexity through Cells to stored Fortran subroutines. RTOS relieves them of having to code for I/O timings, data buffering, priority handling or task scheduling, according to the company.

The system provides a parallel processing capability, and intertask communications and synchronization facilities.

RTOS requires at least 4K words of memory and a real-time clock. It is available immediately at no cost to Nova and Supernova users.

## Currency Conversion Featured In Asystance 'React' Package

RESEARCH TRIANGLE PARK, N.C. — A Responsibility Accounting and Financial Reporting System (React) from Asystance Corp. provides foreign currency conversion at various levels of consolidation in a 65K DOS or OS/360 environment.

The conversion routines are table-driven and can handle any decimal-based currency. A code in each transaction indicates the specific conversion to be made for that item. The ability to alter conversion factor in a table makes the system flexible enough to use even with fluctuating monetary values, the company said.

The basic React package provides for the recording of current year, planned and prior year data in substantial detail, and for any retrieval, according to the firm. It is also a ledger system designed to interface with a standard direct-cost and flexible budgeting system.

The system accepts entries on marketing plans, variable manufacturing budget allowances and standard costs and fixed budgets, along with actual entries to the ledger.

Editing, controls, file maintenance and update capabilities are part of the system. An "Implosion" technique is used for fast summarization of any desired grouping of accounts, regardless of the patterns in existing account codes, according to the company.

The system can provide conventional financial reports, matrix reports and graphic displays. A simulation capability allows the user to anticipate the effect of changes in exchange rates before they take place, the firm said.

React is available for \$40,000 from Asystance Corp., through P.O. Box 12012, 27709.

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# Phase II

# December 1971

## **Inforex introduces 16 keystation shared processor system for \$101 a month\* per keystation.**

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	10,000 @ 61 characters	36,000 @ 61 characters
	20,000 @ 29 characters	72,000 @ 29 characters

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## Two-Way Lines Needed

# CATV May Help Data Users

By Ronald A. Frank  
Of the CW Staff

WASHINGTON, D.C. - Two-way cable TV systems could be used for data transmission in the near future. The data potentials of CATV systems are already being explored and some experts are predicting a link-up of the cable nets with the new

Originally, the cable network concept was developed to bring TV programs into remote locations where over-the-air signals were received with questionable results. Because the majority of CATV lines serve rural and residential areas, they can do little to meet the needs of data users in urban locations.

But the cable nets are headed for the cities, according to Dr. Harold Sackman, director of the Kansas State University computer science department. Despite political and regulatory problems, Sackman sees cable nets coming to the cities because high population areas can give the CATV operators many more subscribers per line than they now get.

Once the business user has access to a CATV link, it will be only a small step to tie him into the specialized courier systems Sackman said. When the cable systems migrate to the cities, they could remove a big burden from the backs of the specialized carriers. For example, MCI had to wait for Bell local loops in both Chicago and St. Louis before it could begin service to its first users. Local CATV lines could be cheaper and more reliable than Bell loops, some observers predict.

## Communications

specialized common carriers. In addition, the FCC is considering a rule that would require two-way capability on all new CATV links.

"Ten years from now, local distribution of data on two-way CATV systems is a distinct possibility," according to Dr. Walter S. Baer, a consultant for the Rand Corp. Baer sees such a data-oriented link coming out of current tests.

One problem, that may soon be remedied, lies in present geographic areas served by CATV systems.

When the CATV link-in may occur on longer intercity links. Several of the applications waiting for specialized carrier approval from the FCC are already operating cable TV networks. One of these is CPI Telecommunications, Inc. in Texas. Its system is now primarily geared to one-way TV distribution. However, the CPI microwave links could be transformed into a two-way operation, which is called "back-hauling."

"With approval from the FCC, we could probably use 60% of our existing facilities for data," CPI President Bill Allot said.

## DUO 360/370 shrinks OS manpower conversion costs up to 90%.

Going from DOS to OS is a battle. For one thing, programmer man-hours are monstrously inflated by the need to reprogram everything from DOS. With DUO 360/370 you get OS results without reprogramming.

For another, OS test time is an obstacle. DUO cuts it by as much as 90%.

And in the conversion, departmental morale suffers heavily. DUO removes the pressure, by removing the need to reprogram everything at once.

What is DUO 360/370? Some kind of knight in shining armor?

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## Order Entry Net Based On Audio Response Unit

DUBUQUE, Iowa - If audio-response data systems are still in their infancy, no one has told the Dubuque Packing Co.

Since 1969, the company has been using an audio response system to handle more than 7,500 weekly meat orders. And since the Dubuque order information is transmitted over dial-up lines, salesmen can send in their data from almost anywhere.

The business end of the nationwide order entry system includes a 360/40 equipped with an IBM 7770 audio response system. In addition to "talking" with each salesman when orders are sent in, the CPU keeps track of shipping routes, total weight of meat ordered, and other vital information.

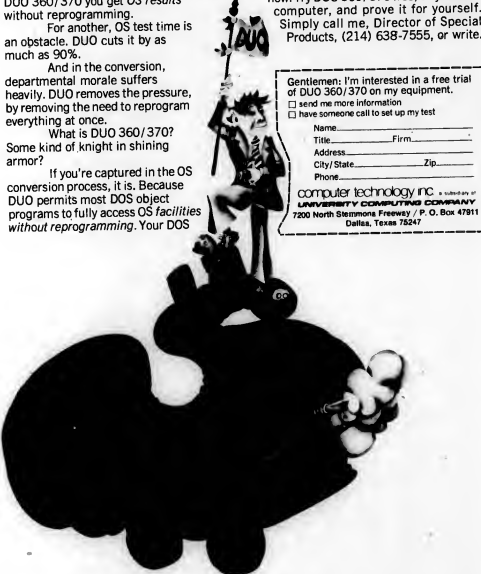
A typical order entry call is initiated by the home office here. At a pre-arranged time, a salesman who may be at a motel, is called. He tells the Dubuque office operator that he has some orders to enter.

At this point, the salesman connects an acoustic coupler device over the mouthpiece (transmitter) of his telephone handset. The coupler is attached to a small Acrodyne terminal and keyboard.

Within a few seconds the 7770 will say, "key salesman." Then using a set of numeric keys together with six control keys, the order information is entered on to the terminal and transmitted.

After each ordered item the response system can break in and talk to the salesman as required. For example, the salesman may be told by the CPU, "Code error, relay." The 7770 has a 32-word vocabulary.

At given intervals during the day, the 360 totals orders, prints out punch cards for each individual line item on order and generates hard copy information as required by management.



December 29, 1971-January 5, 1972

## Bits &amp; Pieces

## Add-On Memories Allow

## 360/30 Expansion to 256K

WARRINGTON, Pa. — Computer Hardware Consultants & Services, Inc. has added two products to its line of 360 add-on memories. Model 3768, previously announced, now includes a 360/30 main memory that can enlarge the system to 256K bytes with no degradation in CPU performance.

The Model 4768, is available for expanding 360/40 main memory to a maximum of 256K bytes. The price of a 65K to 128K memory expansion is \$49,100. The 128K to 256K units are priced at \$90,400.

Delivery is 45 days from 1409 Easton Road, 18876.

## Data Products Increases Speed,

## Adds Model to LCS Replacements

WOODLAND HILLS, Calif. — Data Products Corp. has increased the speed and added a new model to its Large Core Store memory units for the IBM 360/65, and 75.

The cycle time for the 1M byte model of the System/6000 has been increased to 1.8  $\mu$ sec from 2.4  $\mu$ sec; the cycle time of the 2M byte model has been raised to 2  $\mu$ sec. Prices are unchanged, the company said, and existing installations can be upgraded in the field.

Data Products Corp. is at 6219 De Soto Ave., 91364.

## Spatial Data Systems Devices

## Digitize Pictures or Objects

GOLETA, Calif. — A three-model series of compact, high-speed picture digitizers from Spatial Data Systems, Inc. can digitize continuous-tone gray scale pictures or objects.

Available as the Model 1081 for computer interface, by the user, Model 1082 for IBM-compatible tape output, and Model 1083 for interface to and control by a PDP-11/20, the systems can digitize any object that can be televised, according to the firm. The systems offer ease of operation, compactness, ability to handle 256 gray levels, random picture access and direct picture viewing. Spatial Data Systems said.

The systems range in price from \$10,000 to \$17,000 and are available on 60- to 90-day delivery from 132 Aero Camino, 93017.

## Accessory Adds Numeric Input

SANTA MONICA, Calif. — Intended for time-share terminal users, the TTS-16 from Remote Data Terminals, Inc. is a desk calculator-style accessory that operates simultaneously with any Teletype or other Ascii terminal for numeric input.

Priced at \$224, the unit features a 16-key pad that may be used on-line or in local mode to generate paper tape. It is available from 2928 Nebraska Ave., 90404.

## Tape Winder Has Novel Feature

HIGHLAND PARK, Ill. — The heavy-duty TM-204 Utility Tape Winder from Data Specialties, Inc. collects paper tape from readers and punches and uses a tape tensioning arm which turns on the takeup motor only when tape is moving.

It is available from stock at a price of \$75 from 1548 Old Skokie Road, 60035.

## Three-Level Memory

## QM-1 Microcode is User Programmed

By Frank Piasta

of the QM-1

WILLIAMSVILLE, N.Y. — The QM-1 general purpose computer from the Nanodata Corp. offers two levels of user-accessible microprogramming with power equal to that of the 360/40 according to the company.

The QM-1 differs from other computers in offering the user the ability to define his own instruction set and system architecture, dynamically if desired.

The instructions defined by microprogramming (the lowest level of microprogramming) may also be used as the primary machine instruction, with the micro-memory in which they reside as the main memory. This provides user-defined instructions executing at speeds up to about 240 nsec, according to the firm.

The QM-1 is organized to provide maximum generality and flexibility through one or two level emulation. The control processor features:

- Programmed control of gate-level functions, operating at the basic 60 nsec clock rate of the machine.
- A large number of data paths to allow parallel operations
- Ready accessibility of all registers of interest to the programmer
- Dynamically writable control memories at both levels of emulation
- Synchronous logic to enhance parallelism

Flexible combinations of instantaneous and residual control.

The system of storage features a parallel storage hierarchy that includes the 750 nsec main memory usually containing the programs and data of the emulated machine. Instructions here are executed/interpreted/emulated/defined by sequences of microcode actions in the smaller, faster, 75 nsec semi-conductor control store, the firm said. Control store instructions are in turn executed/interpreted/emulated/defined by sequences of nanoinstructions in the 60 nsec nanostore which are executed by hardware to control the machine gates.

A typical configuration that includes

35K 18 bit words of main memory, 2K 18-bit words of control memory, 256 360 bit words of nanostore, eight data channels, CRT display console, 600 card/min reader, 600 line/min printer, two 30K char/sec mag tape drives, and 4M byte disk drive will set for about \$165,000.

## Honeywell Doubles 8200 Core Adds Software, Hardware Options

WALTHAM, Mass. — Honeywell has added a series of software and hardware enhancements to its largest Series 200 computer system, the dual-processor Model 8200.

The enhancements include doubling the main memory capacity to more than 2M char., an on-line diagnostic system, support of previously announced display terminals, and an intermediate-capacity disk drive subsystem.

Software improvements, designed to increase the flexibility and efficiency of program development and execution under the Mod 8 operating system, include tapeless language processors, object module collector, Mod 8 RPG, mass storage sort, dynamic memory re-allocation to improve resource utilization, and provisions to facilitate remote job entry. Main memory of the 8200, which has a cycle time of 750 nsec/48-bit word, has been expanded to 2M char., with the addition of the Model 8201-5. This increase provides 8200 users with the largest main memory capacity offered by Honeywell.

The 8201-5 central system, including dual-logic processors, I/O controller and operator's console can be leased for \$75,494/mo., or purchased for \$3,288,449.

The on-line diagnostic system, called Olds-8200, permits field engineers to perform peripheral diagnostic and test routines while the computer system continues to run production jobs with other peripherals attached to the same control

unit as the one under test, Honeywell explained.

The Type 775 and 785 CRT display system, introduced on smaller Honeywell computer systems, provides larger display access, faster response time and a greater number of displayed characters than prior units for the 8200.

Up to 1,012 char. can be displayed on the 14 in. screen of the 775. The 785 displays up to 2,024 char. Both offer transmission speeds of 250 or 300 char./sec.

The 277 disk drive subsystem provides intermediate-range information storage and retrieval with a basic model capacity of two drives and 133M char. The system can be expanded in increments of 66.5M char. drives to a maximum of eight drives. A full track capacity buffer that enables the device to release the channel until the data has been located and transferred to memory, is available.

The Mod 8 RPG produces programs that prepare reports from one or two sequential input files. Reports can be produced on up to 12 output devices. A high degree of compatibility has been maintained with the Series 200 Report Generators A, B, and C, Honeywell said.

Other enhancements include: right hand console, which permits job entry capacity, object module collector, job restarts expansion, and memory re-allocation.

The on-line diagnostic system and software enhancements are available at no extra cost to 8200 users.

## UCC Terminals Permit Speeds to 50K bit/sec

DALLAS — The Cope 1200 series, a family of medium to high-speed remote computer terminals from UCC Communications Systems, is built around two versions of the UCC-12 Communications Processor. Using the UCC-12 enables data to be transmitted in the 2 to 50 kbit/sec range.

The Cope 1200/1 features a one  $\mu$ sec 4K 12-bit word core memory, upgradeable in increments of 4K or 8K to a maximum of 16K. A communications console is provided along with two 4,000 bit/sec voice grade channels and either 4,800 bit/sec half- or full-duplex interface.

The Cope 1200 II has a similar memory upgradeable to 64K word maximum. Four voice grade or Telpac A channels are provided along with eight peripheral I/O channels, and either one voice grade Telpac A half-duplex or a full-duplex Cope mode communication interface. Additional peripherals can be added as options.

UCC provides necessary operational programs including maintenance diagnostics, IBM-compatible RPG for off-line processing, and utility programs. Specialty communications programs permit the terminals without control processor programming changes, to operate with Cope Communications Controllers and direct replacements for other remote terminals such as IBM 2780, 1130 and 360/20-25, Univac 1004, 1005, 9200, 9300, DCT-2000 and CDC UT-200.

Monthly rental for a typical Cope 1200 terminal equipped with 4K memory, communications interface, card reader and line printer starts at \$665/mo. Delivery is 30 days from 1500 UCC Tower, 75222.

## com Instant microfilm

None of the 360 and 370 computers we've seen is smart enough to tell the difference between a 1443 or 1403 printer and the Quantor 100N microfilm recorder/processor. They wonder why the print output jumps to 10,000 lines a minute. Under \$30,000 with software.

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## 'Asap' Data Base Management System Seen as Good Tool for Teaching EDP

One of the most significant developments in business data processing in the past few years has been the emergence of the generalized data base management systems (GDBMS). Some of these systems are logically complete—they are capable of creating and maintaining a relatively sophisticated data base, as well as selectively retrieving information from that data base.

Moreover, some offer features that really cannot be achieved in any practical way by the general purpose languages (Cobol, PL/I).

In some cases the GDBMS can approximate the capabilities of the ambitious MIS described in the more optimistic data processing literature, and for a large fraction of installations, they offer the only kind of MIS that is going to be practically and economically avail-

able in the near future.

These systems are essentially all proprietary program products and are available to educational institutions only at considerable expense. One system that has an academic background and is being offered to educational institutions on very attractive terms is called ASAP. Developed by Richard Conway, William Maxwell and Howard Morgan of the Departments of Operations Research and Computer Science at Cornell University, it is not a "student compiler" in the usual sense, but a full production system that is being marketed commercially by Compuser Inc.

In ASAP many frequently used declarations are permanently associated with the data base, and do not have to be included in every program that accesses that data base.

The English-like form and compactness of expression are the striking characteristics of ASAP, but it also incorporates several novel concepts that are especially valuable in data processing education. For example, it allows the data-base manager to specify for each potential user, just which records are accessible to him, which fields in those records, and what actions may be performed.

A second ASAP innovation is the concept of "file monitoring." This provides a simple means by which a user can attach a "conditional program" to any arbitrary subset of the file. For example, in an accounts receivable file one could specify an action to be taken whenever an account becomes "delinquent."

ASAP is a powerful vehicle for an introduction to data processing. It emphasizes the fundamental concepts of data organization and processing action without obscuring the essential ideas behind the bewildering details of a conventional programming language.

One Cornell course that teaches both ASAP and PL/I has found it convenient to use ASAP as a problem description language for the PL/I section of the course—that is, an ASAP program is given as a concise and precise description of what is to be programmed in PL/I.

ASAP is useful in advanced courses concerned with management information systems. It makes it practical for students to create and use a simple prototype MIS, and hence converts such a course from a philosophical discussion to a practical laboratory course.

The ASAP file security features and the file monitoring capability are particularly valuable to MIS courses.

Although some of the GDBMS are interpreters and relatively slow, ASAP is a compiler and not prohibitively expensive to use for instruction. Compilation speed is very high—at card read speed even on 360/30s—and relatively efficient object code is produced.

Cornell finds that the total computer costs have increased in data processing courses since the advent of ASAP, but this is due to the use of more ambitious and practical problems and not inherent inefficiency in ASAP.

Costs of \$3.50-\$1.00 per run are typical for processing a program consisting of several independent tasks addressed to a disk file of 250 records where sorting of output is required. (on a 360/65).

ASAP is currently operational only on IBM 360's. There are three versions—DOS (65K minimum system), OS and MTS. A system reference manual and a student programmer's guide are available.

The commercial cost of the ASAP system is approximately \$15,000 but educational institutions can purchase the system for \$1,000 if it is to be used only for instructional purposes. A test copy of the system will be provided without charge by Compuser Inc., P.O. Box 381, Ithaca, N.Y. 14850.



**J. Daniel Couger  
Jr.  
On  
Education**

Couger is professor of Computer and Management Science at the University of Colorado.



**The Professional's Page****What Are Societies' Functions?**

A part of professional life is participation in professional societies. The Society of Certified Data Processors is currently receiving letters giving the writers' viewpoints on the functions of the society in particular, and of professional societies in general.

The topics recently covered include: the danger of a society whose interests are in self-aggrandizement; the situation within the Federal Government regarding DP professionalism; and the employment conditions in certain sections of our industry.

These are all suitable topics for discussion, but they are not sufficiently developed to form any basis for a questionnaire to assist the profession in giving its views. This time, therefore, would you please respond by writing your comments to The Professional Viewpoint Page, c/o Computerworld, 797 Washington St., Newton, Mass., 02160. Thank you.

(The Professional Viewpoint Page is produced by the editors of Computerworld in conjunction with the Society of Certified Data Processors.)

**'Feudal Conditions' Still Exist in DP Industry**

A very distressing situation has come to my attention which makes me wonder if being a computer professional is indeed being a professional. Some computer-oriented companies seem to organize their policies so they have body-and-soul control of their computer people.

They may demand that a new, or prospective employee give up part-time education, when as few as two courses are needed to complete a computer science degree. "You do not need a degree when you work for us."

They require unnecessary financial information, "How much money do you have? Do you have stocks? How much and what company?"

Personal information such as education of all your brothers, sisters and parents is also required.

Later, bonuses and raises are promised for extra effort, but do not materialize. Still later when it is decided the employee makes too much, his manager is given two weeks to find an "excuse" to fire him.

Vacation comes as a privilege, not as an earned right. With advancement, bonuses become stock which is yours only after many years of employment with no guarantees. Pension plans are equally tied up.

The hours are long, 18 to 20 a day, and wives are forbidden to call even if hubby is out of town and has been for weeks. Clothing regulations are at an absurd level, cuffed pants, white shirts (button down), lace shoes, and long socks.

And, the something should be done about this type of operation. If we are professionals we should not have to put up with these "feudal" conditions. And, I believe that our societies, if they are professional societies, should adopt rules that condemn such practices, or at least make it

plain that this type of operation is not approved by the professional population.

Then they should be a real help to us. How about it Society of Certified Data Processors? Do you care about the feudal conditions that are still occurring in the profession? — Sam M. (Name withheld by request).

**Government 'Discourages' Professional Involvement**

I suggest some consideration be given to the problems of Federal Government employees. The constraints we have to work under seem to be quite different than those of private industry. Management seems to discourage professional involvement.

Since the Federal Government is the largest DP user, I feel special attention ought to be given this branch of the profession. — Michael J. CDP.

**Leadership Is Needed Now!**

It's needed. It's timely. It's unlikely to succeed, unless spokesmen of stature and energetic, toughminded CDP holders and aspirants "get with it" to jar ourselves and our complacent DP brethren into an awareness of the reality that the computing and DP community has no unified mechanism for leadership.

This is the time for leadership! Careful planning and setting of objectives, attention to organization structure and dynamic leadership will give the Society of Certified Data Processors a reasonable shot at succeeding; anything less will cause the already puny significance of the CDP movement to become a "Quixotic cult of would-be and has-beens."

Edward Higley has asked what do we need? . . . an appropriate question. Let me ask another question . . . as a Society, what do we have to offer? . . . not only to our members, but more importantly to the development of more efficient and effective computing and data processing.

What our profession needs least is a new organization whose chief interest and activity is, or appears to be, the self aggrandizement of its members. — Robert R. Mowers, CDP.

**Reader Has Cum Laude Degree But Still Can't Join?**

I have read one of the SCDP brochures, "An Invitation to Data Processing Professionals." I feel I have the same aims and qualifications your society has.

I have been a programmer or systems analyst for the past ten years and hold a degree from Boston University in computer sciences (cum laude).

I am "interested in continuing my education and professional career, rather than dead-ending" as mentioned in your brochure. I want to remain "permanently alive" and I feel that I could be an asset to your society.

Why won't you let me join? — Marshall E. Maynes.

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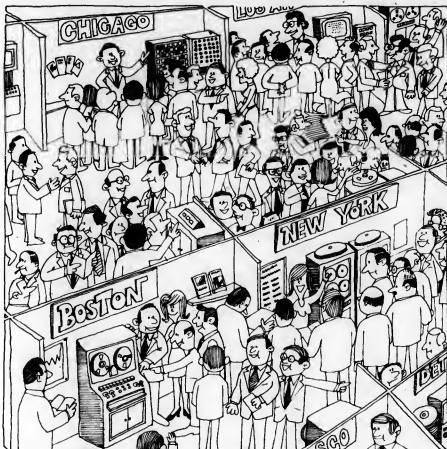
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Some of the details are above. For complete exhibitor information, write or call Charlie Asmus at Computerworld, 797 Washington St., Newton, Mass. 02160. Tel: (617) 332-5606.

## CI Notes

### Court Seeks More Industry Data

**MINNEAPOLIS**—Federal court here has ordered more companies in the computer industry to disclose financial, marketing, and technical information to aid the litigation process in the antitrust suit between IBM and Greyhound Computer Corp.

A spokesman for a terminal company who received the order called the move more than "unfair," but also "eburd" and "un-American."

Judge Philip Neville had originally sent an order to 2,700 companies, and "several hundred" more have come to light after a second review of available information, IBM said.

The goal of this "census project" is apparently to come up with a firm definition of the computer industry, so it can be determined to what—if any—extent IBM has dominated it.

The order promises that not more than 15 IBMs and 10 Greyhounds will be permitted to view the information.

### Com-Share/Computer Complex Suit Expands

**DETROIT**—There have been further developments arising out of the suit between Com-Share and Computer Complex.

Computer Complex filed motions to clarify or amend the preliminary injunctive order issued against it in Federal District Court here, which have been denied. Computer Complex has also filed Notice of Appeal to the U.S. Court of Appeals for the Sixth Circuit. The appeal will apparently seek relief from the injunctive order against Computer Complex, which restrains Computer Complex from disclosing Com-Share proprietary technology.

Com-Share filed a separate suit in the U.S. District Court for the Eastern District of Michigan against Tymshare, Inc. This suit is intended to restrain Tymshare from unlawfully acquiring, using or benefiting from Com-Share proprietary technology.

### Statistics Show Australian Computer Growth

**SYDNEY, Australia**—Statistics compiled here by the Department of Labor and National Service reveal that 1231 computers were in operation in Australia at the end of June 1971, with 303 on order at that date.

The 10th annual report records 42% of these in the small computer class and 8.5% in the large computer bracket. One year earlier these figures were 39% and 5%, respectively.

Out of the 80 large computers in operation at the end of June, 39 were in Government installations. This classification includes universities and public hospitals.

## Supershorts

The Chancery Court in Wilmington, Del., has denied a motion by Data General Corp. for a preliminary injunction which would have restrained Digital Computer Controls from manufacturing D-11B computer. The court also denied Digital Computer Controls' cross motion for a summary judgment to dismiss the complaint. No trial date has been set.

Peripheral Dynamics, Inc. has been awarded a contract by the General Services Administration. The value of the contract is estimated to be in excess of \$250,000 during the next 12 months.

An advanced version of the National Aeronautics and Space Administration's structural analysis computer program, NASTRAN, has been installed on McDonnell Douglas Automation Co.'s IBM 360/85 computers for client use.

An agreement for the settlement of patent litigation between TRW Data Systems, Inc. and Credit Systems Inc. (CSI) has been announced. TRW had filed a patent infringement suit against CSI in October 1970 under its Patent Number 3, 344, 256, and CSI had counterclaimed for a holding of noninfringement and invalidity of the patent. As a part of the settlement, TRW has granted CSI a license under the patent.

Wright-Patterson Air Force Base will purchase equipment to replace an IBM 7084 II system used by the Foreign Technology Division of Air Force Systems Command. Equipment with six to seven times the current throughput capability will be required.

Lockheed Electronic's Data Products Division has shipped the first production order of 50 MAC 16 minicomputers under a contract with Iotron Corp. The MAC 16's are components of Iotron's automatic anticollision navigation system (Diplot) for shipboard use.

## The Year In Review

# Tight Times Force New Trends

By E. Drake Lundell Jr.

Business got tougher as the computer industry went through its first full year of recession during 1971.

Bright spots were few and far between as business in both the end user and OEM sides of the marketplace slumped, with every segment of the industry being hit with recessionary problems.

The most obvious sign of the bad times was the large number of firms leaving the business either by bankruptcy or merger, but the signs were also evident among the companies that were either lucky enough or smart enough to weather the storm.

### RCA Not Alone

The defection of RCA from the mainframe portion of the computer market was the most dramatic exit, but RCA was not alone, as firms in every segment—OEM, software, services, peripherals, terminals, etc.—were forced out of the business.

by stiff competition in shrinking markets.

The number of new entries was also down from recent years as venture capital money left the computer field for greener pastures. And the small number of new startups in no way made up for the mass exodus from the business.

In all, recession-related casualties have contributed to around a 25% decrease in the number of firms serving in the computer user in one form or another over the past year, according to some estimates.

Most industry observers view the consolidation in the peripherals, services and software sectors of the business as having positive effects.

The recession weeded out the weaker firms, these observers suggest, leaving the field open to the stronger and more viable companies, which are better able to serve the users' needs in the areas of equipment and maintenance.

## BEMA To Drop Exhibits, ACM Re-Orients Conclave

By a CW Staff Writer

**WASHINGTON, D.C.**—The Business Equipment Manufacturers Association (Bema) has decided to give up the show business, after experiencing drops in attendance and in the number of exhibitors in their past few shows in New York.

Headquarters' employees here said the decision to drop the Business Expositions was made at an executive board meeting shortly after the fall show in October. C. Matthews Dick, Bema president, would neither confirm nor deny the story.

Equipment on display during

Bema expositions included everything from office furniture to typewriters, calculators, and computers.

It was also learned last week that the Association for Computing Machinery (ACM) would not have commercial exhibits this year and was planning to cancel the exhibit space for its Boston conference next August.

ACM will apparently "sell time" in the form of meeting rooms for 90 minutes each.

"Sponsors" will be permitted to make sales presentations to conference attendees and to invited sales prospects, ACM said.

This consolidation resulted in a move toward "mini-conglomerates" particularly in the peripherals field. More and more firms banded together in order to offer the user a broad range of peripheral products, so the user would only have to deal with one vendor for his peripheral needs.

A related trend involved the entry of OEM houses into the end-user side of the business. Most notable in this category were the large machine houses that started offering end-user products, especially in the area of core extensions or core replacements.

The final results are not in on either of these trends at year-end. One of the earliest and largest of the "mini-conglomerates," Tracor Data Systems, dropped out of the business near the end of the year, and some doubt has been cast on the staying power of some of the entrants from the OEM business.

But the trend will continue into 1972, most industry analysts believe, and by this time next year some conclusions can be made as to the effectiveness of the new entities in the business. Most observers feel the moves will be at least partially successful.

Another trend clearly in evidence during the past year was the reaction of IBM to encroachment on its base of installed equipment.

1971 was the year the independent disk makers captured 10% of the installed IBM disk drive base, and the reaction was furious.

At year-end, most of the independent disk makers captured relatively good footing vis-a-vis IBM, but the profit margins were admittedly way down from the end of 1970.

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# Data Acquisition System Introduced by Varatek

**BEDFORD, Mass.**—A low cost data acquisition, logging and recording system, which uses a party-line bus to provide data transfer from a variety of data sources, is available from Varatek Computer Systems, Inc.

Data from up to 256 digital and/or analog input devices can be polled, synchronously or asynchronously, and transferred to one of 16 output devices. The basic Mides 120 system consists of a solid-state ROM micro-processor with real-time clock, an IBM-compatible magnetic tape drive, I/O data bus and local device controller which adapt each data source to the bus. Controllers are provided for output devices, such as teleprinters, laser, minicomputers, paper tape and card punches and CRTs.

The Mides 120 sells for \$12,250 with one input, and additional inputs are available at \$1,000 each. Delivery is 60 to 90 days from One DeAngelo Drive, 01730. **Digital Arrays Introduced**  
**NEWPORT BEACH, Calif.**—Collins MOS/LSI digital filter arrays serve as building blocks for many digital filter configurations. The cost is less than a comparable passive analog network, and the MOS/LSI digital design offers the ad-

vantages of low power consumption, small size, and increased reliability, Collins said.

The digital filter set consists of four arrays: multiplier, input/output, storage and timing. Each array is fabricated using a high-threshold (Collins Mosar-2) P-channel enhancement mode process. Logic is dynamic and requires two external clock phases.

The arrays are mounted in 24-lead flatpacks or dual in-line packages. Operating temperature range is -55°C to +125°C. Power dissipation of each array is less than 150 mW.

Prices in lots of 10 units are: multiplier array \$36.75, input/output array \$43.90, storage array \$37.10, and timing array \$38.55.

**Bipolar Memory Debuts**  
**WILMINGTON, Mass.**—Integrated Memories, Inc. (IMI), announced its Series 2000 bipolar read/write random access memory systems.

The memory is designed for use in a wide range of memory applications requiring high speed and system organizational flexibility. High performance characteristics, in the 100 nsec access/cycle time range, are achieved by the use of advanced PC technology and dual-in-line packaging, IMI said. Inputs and outputs are fully TTL/DTL compatible.

Some features of the Series 2000 1 include expandable word (from 512- to 8K) and bit length (from 8- to 36 bits) coupled with single rail TTL addressing and data inputs.

A total system price of less than 18 cent/bit is possible in OEM quantities from the firm at 260 Fordham Road, 01887.

**Fabritek 1K X 10 Memory Bows**  
**MINNEAPOLIS, Minn.**—A core memory module has been introduced by the Memory Products Division of Fabritek, Inc.

The Model 620 is a 1K-word by 10-bit high performance core memory designed for desk top computer and similar small memory requirements. A module select line is provided for control of multiple module configurations. The \$450 memory features compact packaging, a 350 nsec access time, 1  $\mu$ sec cycle time, and operates over a temperature range of 0°C to 60°C. It is available on 60 day delivery from 5901 S. County Road, 55436.

**Data Logger Bows**  
**SAN DIEGO, Calif.**—An automatic data logger with expandable functions to

meet fluctuating user requirements, is being introduced by Monitor Labs, Inc. Designated the Model 7200, the basic unit features 10-channel scanning, a choice of digitizers, and programmable data control for any recording formats and codes.

With plug-in options added, the data logger is still a single unit. These accessories offer the capability of driving a variety of recording devices, expanding to 100 analog inputs, and accepting digital inputs.

A digital clock offers automatic start up and time recording. For out of limits channels, a digital comparator is available. Other plug-ins permit manually entered data and external instrument interfacing.

Base price of the Model 7200 is \$2,650. The 30 day delivery is from stock from 10451 Roselle St., 92121.

**Mag Tape Electronics Out**  
**CULVER CITY, Calif.**—Macro Products Corp. has announced a 1600 bit/in.

phase-encoded electronics design package and printed circuit board assemblies. The packages were originally designed for use with IBM 2401 magnetic tape units, Models 4, 5, and 6, and are adaptable to non-IBM tape systems.

Features include reading speeds up to 200 in./sec, and IBM tape compatibility with error checking and correction. Construction utilizes all silicon solid-state logic and a TTL/DTL compatible control interface.

The firm can be contacted through P.O. Box 2807, 90730.

**IC Memory Fits on Card**  
**SANTA CLARA, Calif.**—Intel Corp. has introduced an IC memory system that stores 1K, 12-bit words on one 6 in. by 8 in. PC board and may be expanded to four boards storing 4K, 12-bit words.

A TTL-compatible system built around Intel's 256-bit static MOS RAMs, System in-20 is designed to provide random-access buffer storage for all sorts of computer

peripheral applications.

Maximum system cycle time is 900 nsec. Power requirements are +5V and -9V with an operating temperature range of 0°C to 50°C.

The price is approximately 2 cent/bit to 3 cent/bit in quantity from the firm at 3065 Bowers Ave., 95051.

## Interface System Debuts

**HOUSTON**—A low cost multi-purpose interface system for use with the IBM 1130 has been developed by TC Systems, Inc.

When equipped with this interface system, the IBM 1130 has the capabilities for on-line data acquisition, process control, data transmission and other tasks normally associated with a real-time system. The TCS interface system connects to the IBM 1130 storage access channel.

TC Systems, Inc. is at 3303 S. Rice Ave., 77027.

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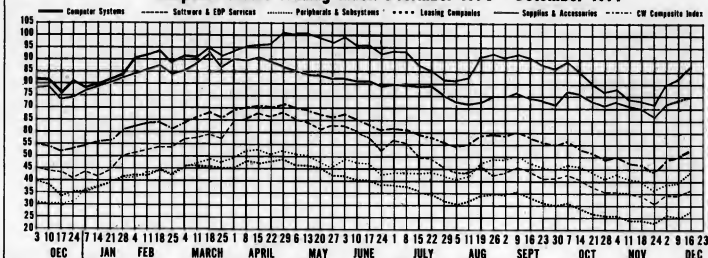
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## Computer Stocks Trading Index December 1970 - December 1971



## Stock Indexes Seen Virtually Unchanged Over Past 12 Months

By a CW Staff Writer

All of the heat and furor of the past year have had little effect on the stock market, or at least on the market for computer stocks.

All of the activity—price decreases, price increases, wage/price freezes, the new Nixon economic game plan, etc.—have failed to make any significant difference in the prices of the stocks surveyed by *Computerworld* for its Composite Index.

On Jan. 7, 1971, the index stood at around 54 and almost a year later on Dec. 16 it was around 52, which is not much of a change considering all of the sound and fury of the past year.

Historically, however, the index is way off its all time high, and 1971 saw it hit the lowest point since it's beginning in March of 1968.

Computer systems was the only one of the indices that reached the 100 mark, which is where the index started over three years ago.

The low point for the composite came on Nov. 24 when it fell below 45 for the first time. It was more than 55 points down from the starting point and over 100 points off the all time high of 150 registered in January of 1969—remember 1968 and 1969?

If there was a good week for computer stocks during the past 52 it was at the end of April, when almost all of the indices hit their yearly highs.

Peripheral company stocks had the hardest year, since they began at around 35 and closed almost 10 points lower.

At the same time, the supplies and accessories category managed to hold up fairly well, beginning and ending at around 75.

Software and services companies, which were once the glamor boys of Wall Street—ended the year at around 35 after hitting a yearly high of 70. That high was a far cry from the 225 all time high reached in September of 1968—remember 1968?

Leasing companies, another one-time darling of Wall Street, began the year at around 35 and managed to struggle up to 50 before falling back to their starting point of 35 at the close.

Almost all of the indexed stocks hit their low points at about the same time, on Nov. 24, but have been boosted by a year-end rally.

Whether the rally is just part of the bullishness on the exchanges in the past few weeks with buyers and brokers full of Christmas cheer, or something deeper, will not be determined until the new year—and new figures—come in.

instead of the usual digital transmission is better not only for data but for many other services as well.

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- By the use of digital system of digital system, and can be used fully digital bases which will not make a single error, more than 100 times.

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## Special Credit Boosts MAI to Profit Despite Declining Revenues In Year

NEW YORK—Management Assistance Inc. (MAI) reported a net profit for the fiscal year ended Sept. 30 of \$2 million or 12 cents per share, including extraordinary credits of \$3.8 million, or 22 cents per share. The loss before the special items amounted to \$1.8 million, equal to 10 cents a share.

For the 1970 fiscal year, MAI reported a loss of \$36.3 million which included a \$32.4 million additional depreciation write-off in the company's leasing operations.

Raymond P. Kuran, MAI president, said the extraordinary credits reflected the interest savings on long-term debt resulting from waivers of interest obtained from its debt-holders under the company's recapitalization plan effected earlier this year, and the application of available tax carryforwards.

Revenues in fiscal 1971 were \$52 million compared with \$64 million in the prior year. Kuran indicated that this decline in revenues was due in large part to the loss of rentals from unit record equipment, a decline that was less than anticipated. However, service revenues from end-user owners and non-affiliated

manufacturers of a variety of equipment rose to approximately \$4 million for fiscal 1971 as compared to approximately \$2.3 million in fiscal 1970.

The year-end results reflected a fourth quarter loss of \$352,000, after extraordinary credits of \$226,000. This loss was attributed to expenses incurred in continuing certain programs including the new Basic/Four computer.

Kuran announced that orders for that system have already reached the \$1.2-million level in the southern California area. Approximately one-third of these have already been installed at customer locations.

### D-J. Bunker Ramo Announce Financial Information Service

NEW YORK—Dow Jones & Company, Inc. and Bunker Ramo Corp. have announced formation of a joint company to provide computerized news retrieval service for stock brokerage firms, banks and other businesses.

The new company, Dow Jones-Bunker Ramo News Retrieval Service, Inc., will prepare and transmit to wholesalers or end-users a data base consisting of news published by Dow Jones on the Dow Jones News Service and in the Wall Street Journal and Barron's magazine.

A special feature will alert a user any time news develops on pre-selected companies in which he has an interest.



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TRADE QUOTES

# Computerworld Stock Trading Summary

All statistics  
compiled, computed  
and furnished by  
**TRADE-QUOTES, INC.**  
Cambridge, Mass. 02138

CLOSING PRICES THURSDAY, DECEMBER 23, 1971

		1971 RANGE	CLOSE DEC 16	1971 HIGH	1971 LOW	1971 OPEN	1971 CLOSE	1971 OPEN	1971 CLOSE
A	ADVANCED COMP. TECH.	1-4	1	0.0	0.0	0.0	0.0	0.0	0.0
A	APPLIED DATA RES.	1-3	5 1/2	5	0.0	0.0	0.0	0.0	0.0
A	APPLIED LOGIC	1-3	1/4	0.0	0.0	0.0	0.0	0.0	0.0
N	AUTOMATIC DATA PROC.	4-14	7 1/4	1/4	0.0	0.0	0.0	0.0	0.0
N	AUTOSCIENCES	1-8	1/4	0.0	0.0	0.0	0.0	0.0	0.0
N	COMPUTER NETWORK	2-11	7	+3 1/4	+86.0	0.0	0.0	0.0	0.0
N	COMPUTER PROPERTY	1-5	5 1/8	0.0	-6.3	0.0	0.0	0.0	0.0
N	COMPUTER SCIENCES	6-17	8 1/2	1/4	-1.8	0.0	0.0	0.0	0.0
N	COMPUTER TECHNOLOGY	1-11	6 1/4	0.0	+11.1	0.0	0.0	0.0	0.0
N	COMPUTER USAGE	4-14	7 1/4	1/4	+3.3	0.0	0.0	0.0	0.0
N	CAMP AUTOMAT. REPORTS	6-13	7	0.0	0.0	0.0	0.0	0.0	0.0
N	COMPUTING & SOFTWARE	17-45	22 5/8	-1 1/2	-6.2	0.0	0.0	0.0	0.0
O	CONGRESS	1-4	1 1/2	0.0	+8.0	0.0	0.0	0.0	0.0
O	CONSHARE	8-1	3 1/4	0.0	+5.0	0.0	0.0	0.0	0.0
O	DATA AUTOMATION	1-4	1 1/2	0.0	+100.0	0.0	0.0	0.0	0.0
O	DATA PACKAGING	6-10	6 1/4	0.0	0.0	0.0	0.0	0.0	0.0
O	DATATION SERVICE	1-3	3/8	0.0	0.0	0.0	0.0	0.0	0.0
L	DATATAP	10-10	7 1/8	+1 1/8	+18.0	0.0	0.0	0.0	0.0
O	DEO RESOURCES	5-16	5 1/4	-1 1/2	-8.6	0.0	0.0	0.0	0.0
N	KEYDATA CORP.	4-14	5 1/8	0.0	+1.0	0.0	0.0	0.0	0.0
N	ELECTRONIC DATA SYS.	34-85	45 1/2	-2 1/2	-3.2	0.0	0.0	0.0	0.0
N	INFORMATICS	6-13	3	0.0	+2.0	0.0	0.0	0.0	0.0
N	I.O.A. DATA CORP.	1-3	1	0.0	-27.2	0.0	0.0	0.0	0.0
A	ITEL	7-23	9 5/8	1/8	-1.2	0.0	0.0	0.0	0.0
N	KEANE ASSOCIATES	1-4	6 1/2	-1 1/2	-10.0	0.0	0.0	0.0	0.0
N	KEYDATA CORP.	4-14	5 1/8	0.0	+1.0	0.0	0.0	0.0	0.0
N	NATIONAL DATA	5-11	6 1/8	0.0	+2.0	0.0	0.0	0.0	0.0
N	MANAGEMENT DATA	7-14	7	0.0	+3.4	0.0	0.0	0.0	0.0
N	NAT. COMP. ANALYSTS	1-4	3/8	0.0	0.0	0.0	0.0	0.0	0.0
P	ON LINE SYSTEMS INC.	7-18	8 1/2	+1 1/2	+6.2	0.0	0.0	0.0	0.0
N	PLANNING RESEARCH	10-26	14 3/8	+1 1/8	+0.5	0.0	0.0	0.0	0.0
N	PROGRAMMING METHODS	14-29	23	0.0	+1.0	0.0	0.0	0.0	0.0
N	PROGRAMMING & SYS.	1-4	1 1/8	-1/4	-13.3	0.0	0.0	0.0	0.0
N	SCIENTIFIC COMPUTERS	2-3	2 1/2	0.0	0.0	0.0	0.0	0.0	0.0
N	SIMPLICITY COMPUTER	1-3	1	-1/4	-20.0	0.0	0.0	0.0	0.0
N	SOFTWARE SYSTEMS	1-3	1	-1/4	-20.0	0.0	0.0	0.0	0.0
N	TBS COMPUTER CENTERS	9-9	3 3/4	-1/4	-3.2	0.0	0.0	0.0	0.0
N	TOLLETT INTL. CORP.	2-7	3 1/4	0.0	+1.0	0.0	0.0	0.0	0.0
N	TRACOR COMPUTING	2-5	2 1/4	0.0	+20.0	0.0	0.0	0.0	0.0
N	TYMESHARE INC.	4-13	8	+1 1/8	+16.3	0.0	0.0	0.0	0.0
N	UNITED DATA CORP.	2-7	7 1/4	0.0	+6.5	0.0	0.0	0.0	0.0
N	UNIVERSITY COMPUTING	14-20	20 1/4	+1 1/4	+6.5	0.0	0.0	0.0	0.0
A	VIS SYSTEMS	5-11	6 1/8	+1/2	+8.1	0.0	0.0	0.0	0.0
N	VORTER CORP.	2-6	5 1/2	-1/4	-4.3	0.0	0.0	0.0	0.0

PERIPHERALS & SUBSYSTEMS

N	ADDRESSOGRAPH-MULT.	24-48	33 1/2	+2 3/8	+9.3	0.0	0.0	0.0	0.0
N	ALPHAMERIC	12-25	13 1/2	0.0	+2.0	0.0	0.0	0.0	0.0
N	AMPEX CORP.	12-25	13 1/2	0.0	+2.0	0.0	0.0	0.0	0.0
N	ANDERSON JACOBSON	5-10	5	0.0	0.0	0.0	0.0	0.0	0.0
N	ATLANTIC TECHNOLOGY	3-8	2 1/2	-1/2	-16.6	0.0	0.0	0.0	0.0
N	SOLT, GERANKE & NEW	8-8	5 1/8	0.0	+3.1	0.0	0.0	0.0	0.0
N	BUNKER-RAND	6-17	8 1/8	-1/4	-2.9	0.0	0.0	0.0	0.0
N	CALCOMP	34-35	20 3/2	+1 1/4	+6.4	0.0	0.0	0.0	0.0
N	CONTRONICS	2-9	4	+1/4	+7.7	0.0	0.0	0.0	0.0
N	COLORADO INSTRUMENTS	2-9	4	+1/4	+7.7	0.0	0.0	0.0	0.0
N	COMPUTER COMMUN.	2-10	5 1/2	-7/8	-15.7	0.0	0.0	0.0	0.0
N	COMPUTER EQUIPMENT	3-7	5 1/2	-1/2	-12.5	0.0	0.0	0.0	0.0
N	COMPUTEST	4-20	6 1/2	+1/8	+1.9	0.0	0.0	0.0	0.0
N	CORNEIL COMPUTER LTD.	3-10	4	0.0	-2.7	0.0	0.0	0.0	0.0
N	DATA PRODUCTS CORP.	3-10	4	0.0	-2.7	0.0	0.0	0.0	0.0
N	DATA RECOGNITION	3-8	3 3/4	+1/4	+7.1	0.0	0.0	0.0	0.0
N	DATA TECHNOLOGY	3-9	3 1/4	+1/4	+10.1	0.0	0.0	0.0	0.0
N	DIGITRONICS	2-8	3 1/4	+1/4	+8.1	0.0	0.0	0.0	0.0
N	ELECTRONIC M & M	5-16	6 3/8	-3/8	-8.3	0.0	0.0	0.0	0.0
N	FABRI-TEX	2-9	4	0.0	+1.0	0.0	0.0	0.0	0.0
N	GENERAL COMPUTER SYS.	6-10	7 1/2	+1/4	+4.4	0.0	0.0	0.0	0.0
N	GENERAL ELECTRIC	53-124	66 3/2	+7/8	+1.3	0.0	0.0	0.0	0.0
N	INFODISK INC.	3-8	4 3/4	+1/4	+4.1	0.0	0.0	0.0	0.0
N	INFORMATION DISPLAYS	3-8	5 1/8	0.0	0.0	0.0	0.0	0.0	0.0
N	MANAGEMENT ASSIST.	1-2	2 1/2	-1/8	-16.6	0.0	0.0	0.0	0.0
N	HARBALL INDUSTRIES	10-28	32 1/2	+5 1/4	+19.2	0.0	0.0	0.0	0.0
N	HEWLETT	12-26	17 3/8	+2 1/2	+16.6	0.0	0.0	0.0	0.0
N	NILOD ELECTRONICS	12-26	17 3/8	+2 1/2	+16.6	0.0	0.0	0.0	0.0
N	NONIAC DATA SCI.	12-26	17 3/8	+2 1/2	+16.6	0.0	0.0	0.0	0.0
N	OPTICAL SCANNING	6-18	7	+1/2	+7.8	0.0	0.0	0.0	0.0
N	PHOTON	8-12	7 1/4	-1/4	-5.3	0.0	0.0	0.0	0.0
N	POTTER INSTRUMENT	11-25	15	0.0	+3.4	0.0	0.0	0.0	0.0
N	PRECISION INST.	7-16	5 1/4	+3/4	+5.3	0.0	0.0	0.0	0.0
N	RECOGNITION EQUIP.	9-26	10 3/8	-3/8	-5.4	0.0	0.0	0.0	0.0
N	REDCOR CORP.	1-9	3 1/4	+1/4	+10.1	0.0	0.0	0.0	0.0
N	SANDERS ASSOCIATES	9-22	12 3/4	-1 1/8	-8.1	0.0	0.0	0.0	0.0
N	SCAN DATA	6-15	10 1/8	+1/2	+5.1	0.0	0.0	0.0	0.0
N	TALLY CORP.	6-16	8	0.0	+5.0	0.0	0.0	0.0	0.0
N	TELEX	8-22	12 3/4	+1/4	+5.0	0.0	0.0	0.0	0.0

SUPPLIES & ACCESSORIES

N	ADAMS-HILLIS CORP.	9-10	10 3/8	+3/8	+3.7	0.0	0.0	0.0	0.0
N	BALTIMORE BUS FORMS	6-10	3 1/4	+1/2	+6.4	0.0	0.0	0.0	0.0
N	BARRY WRIT	7-13	9 1/4	+1/4	+1.3	0.0	0.0	0.0	0.0
N	DATA DOCUMENTS	2-9	3 1/4	+1/4	+10.1	0.0	0.0	0.0	0.0
N	DUPLEX PRODUCTS INC.	8-12	12 1/4	+1/8	+10.1	0.0	0.0	0.0	0.0
N	EMIS BUS FORMS	5-13	7 3/8	0.0	0.0	0.0	0.0	0.0	0.0
N	ORANAM MAGNETICS	9-35	14 7/8	-1/8	-0.8	0.0	0.0	0.0	0.0
N	GRAPHIC CONTROLS	6-13	13 1/4	+1/4	+5.2	0.0	0.0	0.0	0.0
N	3M COMPANY	96-134	139 1/4	-7/8	-0.4	0.0	0.0	0.0	0.0
N	MOORE BUS FORMS	35-43	42 1/2	-3/4	-17.7	0.0	0.0	0.0	0.0

		1971 RANGE	CLOSE DEC 16	1971 HIGH	1971 LOW	1971 OPEN	1971 CLOSE	1971 OPEN	1971 CLOSE
N	STANDARD CORP.	29-30	30	80 1/2	-1 1/4	-3.9	0.0	0.0	0.0
N	REYNOLDS & REYNOLD	37-45	45	1/2	+1.8	+11.0	0.0	0.0	0.0
N	STANDARD REGISTER	14-25	16 1/2	+1 1/8	+12.8	0.0	0.0	0.0	0.0
N	TAB PRODUCTS CO.	8-17	25	1/2	-1/2	-3.2	0.0	0.0	0.0
N	UNARCO	23-25	24 3/4	+1	+4.3	0.0	0.0	0.0	0.0
N	WABASH MAGNETICS	14-26	23 3/8	+7/8	+5.8	0.0	0.0	0.0	0.0
N	WALLACE BUS FORMS	18-26	23 3/8	+7/8	+5.8	0.0	0.0	0.0	0.0

COMPUTER SYSTEMS

N	BURROUGHS CORP.	105-160	152 1/4	+3 1/2	+2.3	0.0	0.0	0.0	0.0
N	COLLINS INC.	12-27	13 1/8	-1 1/8	-11.0	0.0	0.0	0.0	0.0
N	CONTROL DATA CORP.	30-43	43 1/2	-3 1/8	-2.9	0.0	0.0	0.0	0.0
N	DATA GENERAL CORP.	12-16	56	-5 1/4	-8.5	0.0	0.0	0.0	0.0
N	DIGITAL COMP. CONTROL	4-24	14 3/4	+3/4	+5.3	0.0	0.0	0.0	0.0
N	DIGITAL EQUIPMENT	53-85	77	-1 1/4	-0.3	0.0	0.0	0.0	0.0
N	ELECTRONIC ASSOC.	5-9	5 3/8	0.0	0.0	0.0	0.0	0.0	0.0
N	ELECTRONIC ENGINEER.	25-46	35 3/4	-1 1/4	-0.0	0.0	0.0	0.0	0.0
N	FEEDBACK	25-46	35 3/4	-1 1/4	-0.0	0.0	0.0	0.0	0.0
N	GENERAL AUTOMATION	9-26	11 3/4	-1 1/4	-0.6	0.0	0.0	0.0	0.0
N	HELETT-PACKARD CO.	15-20	16 1/2	-2	-1.5	0.0	0.0	0.0	0.0
N	HELETT-PACKARD CO.	87-137	130 5/8	-2	-1.5	0.0	0.0	0.0	0.0
N	IBM	284-364	356	0.0	-0.8	0.0	0.0	0.0	0.0
N	INTERDATA INC.	6-11	11 3/4	+1/8	+1.5	0.0	0.0	0.0	0.0
N	NEC	28-40	28 7/8	-1	-3.3	0.0	0.0	0.0	0.0
N	NCA	26-41	37 3/8	+1/4	+0.6	0.0	0.0	0.0	0.0
N	NATHANSON CO.	27-46	40 1/4	+1/4	+4.6	0.0	0.0	0.0	0.0
N	N SPERRY RAND	35-38	31 1/4	+1 1/4	+4.1	0.0	0.0	0.0	0.0
N	SYSTEMS ENG. LABS	7-18	8 3/4	+5/8	+6.8	0.0	0.0	0.0	0.0
N	VARIAN ASSOCIATES	11-18	13 1/4	-1/8	-0.9	0.0	0.0	0.0	0.0
N	VICTOR COMPUTER	12-27	15 3/4	+7/8	+5.8	0.0	0.0	0.0	0.0
N	WANG LABS.	29-30	42 1/2	+6 1/2	+11.6	0.0	0.0	0.0	0.0
N	XEROX CORP.	85-126	125 1/2	+4 3/8	+5.6	0.0	0.0	0.0	0.0

LEASING COMPANIES

A	BOOTH COMPUTER	11-27	17 3/8	+1/8	+0.9	0.0	0.0	0.0	0.0
N	BRENNAN COMP.	2-4	2 3/8	+1/8	+1.7	0.0	0.0	0.0	0.0
N	COMPUTER EXCHANGE	1-9	1 7/8	-1/8	-11.7	0.0	0.0	0.0	0.0
N	COMPUTER INVESTS GRP.	2-4	8	-1/4	-3.0	0.0	0.0	0.0	0.0
N	CPF INC	8-10	10	+3/8	+3.8	0.0	0.0	0.0	0.0
N	DATA RENTAL	2-4	2 1/2	0.0	0.0	0.0	0.0	0.0	0.0
N	DEL INC.	2-5	5 1/8	-5/8	-10.5	0.0	0.0	0.0	0.0
N	DIAMOND-STORM	12-23	23	+2 1/4	+18.0	0.0	0.0	0.0	0.0
A	OPA, INC.	4-9	9 7/12	-1/4	-9.0	0.0	0.0	0.0	0.0
N	ORANGE CORP.	2-4	4	-1/8	-1.0	0.0	0.0	0.0	0.0
A	GREYHOUND COMPUTER	7-11	8 5/8	-3/8	-6.0	0.0	0.0	0.0	0.0
N	LEASCO CORP	16-26	21	0.0	0.0	0.0	0.0	0.0	0.0
J	LECTRO MGT INC	2-5	2 1/2	0.0	0.0	0.0	0.0	0.0	0.0
N	LEWIS INDUSTRIES	2-5	5	-1/8	-4.0	0.0	0.0	0.0	0.0
A	ROCKWOOD COMPUTER	3-9	3 5/8	1/8	+3.0	0.0	0.0	0.0	0.0
D	SYSTEMS CAPITAL	3-9	3 5/8	1/8	+3.0	0.0	0.0	0.0	0.0
N	TELECOM	2-5	5 1/2	-1/8	-4.0	0.0	0.0	0.0	0.0



## Once maps were made by hand.

## But why today?

Once, a man told another of what he'd seen and that man drew a map that all others could follow.

All of that was done by hand. That was then.

Today, a man takes a picture from an airplane of what he sees. And a second man prepares a manuscript from these photos. And then, this manuscript is transferred to film.

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